



Vol. XIII.—No 7.

JULY, 1900

PRICE 20 CENTS
\$2.00 PER YEAR.

The Largest Radiator Manufacturers under the British Flag

SAFFORD RADIATORS

For STEAM
or WATER

Made WITH and WITHOUT Diaphragms

THE DOMINION RADIATOR COMPANY, LIMITED
Toronto - Canada

HYDRAULIC
FOR
FREIGHT
AND
PASSENGER

FAST
HEAVY
GEARS
LEVER
VALVES

SCREW GEAR
BELL
STEAM
POWER
SPUR GEAR

PORTABLE FLOOR
& CEILING HOISTS
SPECIAL STYLES
FOR EVERY BUSINESS

HAND POWER
HORSES
AND
LIFTS

ELECTRIC
SAFETY
ELEVATORS

DIRECT
TANK
AND
PUMPING
SYSTEMS

SAFETY CARS
OF NEW
DESIGN
BEAUTIFUL DESIGN

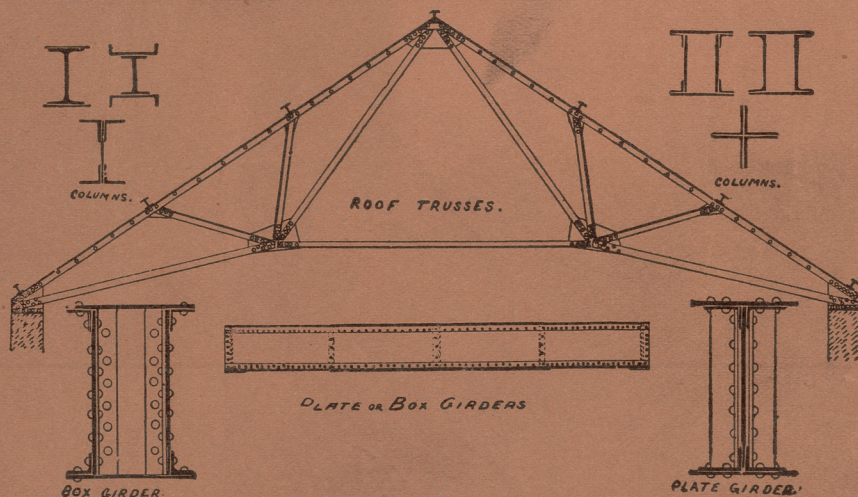
LEITCH & TURNBULL

HAMILTON - ONTARIO

FENSOM'S

**Electric
Hydraulic
Steam
Hand-Power**

All made of the best material and
finest workmanship.



DOMINION BRIDGE CO. (LIMITED)

WE BUILD

Bridges of all designs in both Iron and Steel, Roofs, Telephone Poles, House Girders, and all kinds of Structural Iron Work.

OUR STOCK IN HAND COMPRISES

Steel Beams, Angles, Tees, Channels, Plates, Rolled Edged Flats, Bars, Rivets, Rounds, &c.; Iron Beams, Bars, Squares, Rounds, Turnbuckles, Rivets, &c.

Estimates furnished for Structural Iron Work delivered at building or erected.

GEORGE E. EVANS,
Ontario Agency: Room 38, Canada Life
Building, Toronto Telephone 2164.

P. O. Address
DOMINION BRIDGE CO. Ltd., Montreal, P.Q.
Works at Lachine Locks, P.Q.

For Information About

MAIL CHUTES

WHICH ARE
A Necessity in Office Buildings and Hotels,

Write to the sole makers
THE CUTLER MFG. CO., ROCHESTER, N. Y.,
PATENTED AUTHORIZED U. S. A.

A. B. ORMSBY & CO.

SHEET METAL CONTRACTORS

Ceilings, Cornices,
Sky-Lights, Roofing, Etc.

126 QUEEN ST. E. - TORONTO
Telephone 1725

Fensom Ele-
ator Works:
52, 54, 56
Duke Street,
TORONTO,
ONT.

ELEVATORS

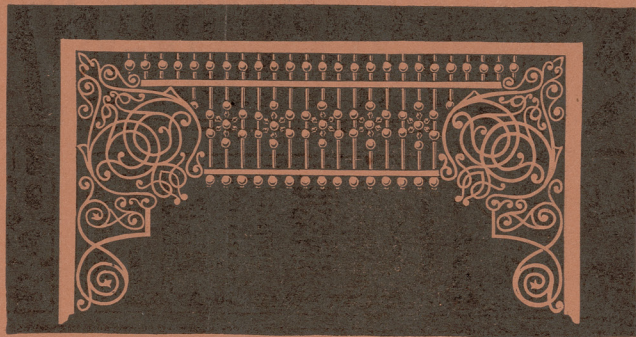
ESTABLISHED 1849.
 CHARLES F. CLARK, JARED CHITTENDEN,
 President, Treasurer
BRADSTREETS'
 Capital and Surplus, \$1,500,000.
Offices Throughout the Civilized World

Executive Offices:
 Nos. 346 and 348 Broadway, NEW YORK CITY, U.S.A.
 THE BRADSTREET COMPANY gathers information that reflects the financial condition and the controlling circumstances of every seeker of mercantile credit. Its business may be defined as of the merchants, by the merchants, for the merchants. In procuring, verifying and promulgating information, no effort is spared, and no reasonable expense considered too great, that the results may justify its claim as an authority on all matters affecting commercial affairs and mercantile credit. Its offices and connections have been steadily extended, and it furnishes information concerning mercantile persons throughout the civilized world.
 Subscriptions are based on the service furnished, and are available only by reputable wholesale, jobbing and manufacturing concerns, and by responsible and worthy financial, fiduciary and business corporations. Specific terms may be obtained by addressing the company at any of its offices. Correspondence invited.

THE BRADSTREET COMPANY.

Toronto Office: Cor. Melinda and Jordan Streets.
 Hamilton Office: No. 39 James Street South.
 London Office: No. 365 Richmond Street.
 Winnipeg Office: No. 398 Main Street.
 Vancouver Office: Cor. Hastings and Hamilton Streets.
 Victoria Office: Board of Trade Building.
 THOS. C. IRVING, Gen. Mgr. Western Canada,
 TORONTO, ONT

Advertise in the ARCHITECT AND BUILDER.



The Southampton Mfg. Co., Limited

... MANUFACTURERS OF ...

**Moorish Fret Work,
 Spindles, Grille,**

**Turned and Twisted Mouldings,
 Spiral Turnings, Balls and
 Spindles, Newels and Balusters**

SEND FOR CATALOGUE.

SOUTHAMPTON, ONTARIO, CANADA



**REPRODUCTIONS
 OF
 ARCHITECTURAL
 DRAWINGS**

in
**HALF TONE,
 ZINC ETCHING, or
 WOOD ENGRAVING.**

Receive our most careful attention, and they always please.

Write, Phone, or Call **MOORE & ALEXANDER**

16 Adelaide Street West,
 TORONTO,



ARCHITECTS : CONTRACTORS : ENGINEERS : ETC.

SHOULD SEND FOR A COPY OF THE

Canadian Contractor's Hand-Book

The Canadian Contractors' Hand-Book will be sent to any address in Canada or the United States on receipt of price, \$1.50; to subscribers of the CANADIAN ARCHITECT AND BUILDER, \$1.00.

Branch Office:

Imperial Building, Montreal.

The C. H. MORTIMER PUBLISHING CO. of Toronto, Limited, Publishers,

Confederation Life Building, Toronto.

INDEX TO ADVERTISEMENTS

In the "Canadian Architect and Builder."

Architects.
Ontario Directory.... III
Quebec Directory.... xii

Architectural Sculptors and Carvers.
Holbrook & Mollington... i

Architectural Iron Work.

Canada Foundry Co ix
Dominion Bridge Co. I
Hamilton Bridge Works Co..... IV

Art Woodwork
Southampton Mfg. Co. II

Artists' Materials.
Hearn & Harrison... III
The Art Metropole... III

Builders' Supplies.
Bremner, Alex..... i
Montreal Directory.. xiv
Ontario Lime Association... xiv
Robertson & Co. D... vi
Rice Lewis & Son... IV
Toronto Directory... xiv

Building Stone Dealers.

Brodie, James..... vi
Credit Forks Stone Co vi
Pickard, C..... vi
Robertson & Co., D... vi
The Longford Quarry Co..... vi

Builders' Hardware.

Rice Lewis & Son... IV
Wheeler & Pain... xiv

Boiler Covering.
Mca Boiler Covering Co..... i

Bricks.
Luxfer Prism Co.... xi
Toronto Pressed Brick & Terra Cotta Co... iv

Conductors.
Wire & Cable Co... vii

Contractors' Plant and Machinery
Rice Lewis & Son... IV

Cements.
Bremner, Alex..... i
Commercial Wood & Cement Co..... IV
Owen Sound Portland Cement Co..... IV
The Rathbun Co.... xii

Creosote Stains
Cabot, Samuel... IV
Canada Paint Co.... x

Drain Pipe
Bremner, Alex..... i
Canadian Sewer Pipe Co..... III

Elevators
Fensom, John..... I
Leitch & Turnbull... I
Miller Bros & Toms. vi
Turnbull & Russell ColV

Embossed Moulding
Boynton & Co..... II

Engravers.
Can. Photo-Eng Bureau..... II

Folding Partitions.
Springer, O. T..... xii

Grilles and Railings.
Dennis Wire & Iron Co. viii
Toronto Fence & Ornamental Iron Works. vii
Southampton Mfg. Co II

Granite
Brunet, Jos..... vi
Brodie, James..... vi
Stanstead Granite Quarries Co..... vi

Heating.
Canada Radiator Company..... iii
Clare Bros. & Co..... iv
Dominion Radiator Mfg. Co..... i-vii
Gurney Foundry Co v
Leonard & Sons, E... xiv
McClay & Mfg. Co... xiii
Ormsby & Co., A. B. I
Pase France C... ix
Smart Mfg Co, Jas... xi
Red & Co., Geo. W. xii

Drawing Inks
Stueber, Harry..... III

Interior Decoration
Elliott & Son Co.... vii
John Kay, Son & Co. 143

Lime.
Ontario Lime Association... xiv
Robertson & Co.... vi

Legal.
Quinn & Morrison... III

Lighting Apparatus
Ac. tylen Mfg. Co... iv

Marble Mosaic Flooring.
Luxfer Prism Co.... xi

Mantles, Grates, and Tiles.
Chas. Rogers & Sons Co..... viii
Holbrook & Mollington i
Rice Lewis & Son... IV

Mail Chutes.
The Cutler Mfg. Co.. I

Mortar Colors and Shingle Stains.
Cabot, Samuel... IV
Canada Paint Co.... x
Muirhead, Andrew...

Ornamental Iron Work.
Dennis Wire & Iron Co viii
Luxfer Prism Co.... xi
Toronto Fence & Ornamental Iron Works. vii

Painters.
Montreal Directory... xiv
Toronto Directory... xiv

Prisms.
Luxfer Prism Co.... xi
Lyon, N.T., Glass Co... 143

Paints & Varnishes
Muirhead, Andrew... i

Parquetry Floors
Elliott & Son Co.... viii

Plate Glass
The Consolidated Plate Glass Co..... III
Toronto Plate Glass Co..... viii

Plumbers
Montreal Directory... xiv
Toronto Directory... xiv

Reflectors
Frink, I. P..... III

Roofing Materials
Ormsby & Co., A. B... I
Metallic Roofing Co. 144
Pedlar Metal Roofing Co..... x
Roofers Supply Co... i

Roofers
Campbell & Gilday... xiv
Duthie & Sons, G.... xiv
Forbes Roofing Co... xiv
Nicholson & Co, D... xiv
Ormsby & Co., A. B. I
Rennie & Son, Robt. xiv
Stewart & Co., W. T. xiv
Williams & Co., H... xiv

Stained and Decorative Glass
Bloomfield & Son, Henry..... i
Horwood & Sons, H. Leonard, B..... i
Mackey Stained Glass Co..... i
McKenzie's Stained Glass Works..... i
The Robert McCausland Stained Glass Co..... i
Wood, S. F..... i

Shingles and Siding
Metallic Roofing Co... vii
Ormsby & Co., A. B. I
Pedlar Metal Roofing Co..... x
Roofers Supply Co... i

Soil Pipe.
Toronto Foundry Co. III

School and Church Furniture.
Can. Office & School Furniture Co..... xii
Globe Furniture Co... xii

Terra Cotta.
Luxfer Prism Co.... x

Ventilators
Boston Blower Co... xii

Wall Plaster
Albert Mfg. Co.... vi
Bremner, Alex..... i

Wire Lathing
The B. Greening Wire Company..... 143

Architectural. Sculptors..

Modellers,
Wood Carvers
etc. . .

Dealers in
Maw & Co.'s
and Minton &
Co.'s Artistic and
Plain Tiles for Cabinets,
Hearths, Floors, etc.

Holbrook & Mollington

No. 206 King St. West,
TORONTO.
TELEPHONE 2490.

ANDREW MUIRHEAD,
TORONTO

MANUFACTURER OF

VARNISHES

Of every description.

Wood Fillers, Paints & Painters'

Supplies generally.

AGENT FOR

SAMUEL CABOT'S CELEBRATED MORTAR
COLORS and CREOSOTE STAINS

OFFICE :

82 Bay St.

FACTORY :

St. Lawrence St.

Warehouse : 15 and 17 Mincing Lane.

Glass Painting....
Memorial Windows

MCKENZIE'S STAINED GLASS WORKS

8 AND 10 MAIN STREET EAST

Church and Domestic
Ornamental Glass. **Hamilton, Ont.**

Original Designs made to suit all classes of work.

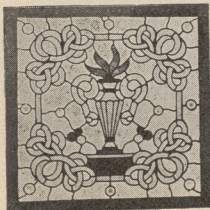
The Robert McCausland
Stained Glass Company, Limited

MEMORIAL WINDOWS
DOMESTIC ART GLASS

87 King Street West,

Telephone 195.

TORONTO



CHURCH AND DOMESTIC

Art
Stained
Glass

S. F. WOOD

638 Dundas St. E.
LONDON, ONT.

.. HENRY BLOOMFIELD & SON ..
ART GLASS WORKERS

BOX 414

VANCOUVER, B.C.

SKETCHES AND PRICES ON APPLICATION.

ART GLASS WORKS

ESTABLISHED 1876.

Memorial Church Windows,
Geometrical and Quarrie Windows,
Art Glass for Residences, etc.

Send for designs and prices to

H. HORWOOD & SONS PRESCOTT, ONT.,
98 Bank Street, - and Ogdensburg, N.Y.
OTTAWA.



B. LEONARD

MANUFACTURER

STAINED GLASS

FOR

Churches, Private Houses, Etc.

53 ST. JOHN ST.

- QUEBEC

Estimates and Designs furnished on application.

8371 — Telephones — 1936

The Roofers' Supply Co.
LIMITED

WHOLESALE AND RETAIL DEALERS IN ..

ALL KINDS OF ROOFING MATERIAL

Slate, Roofing Felt, Roofing Pitch, Terra Cotta
Tiles, Galvanized Iron, Sheet Copper, Slate Nails,
&c., &c., &c.

30 Widmer Street - **TORONTO**

PORTLAND CEMENT



Calced Plaster

Sewer Pipes

Fire Bricks

Fire Clay

Baker's Plaster Board

ALEX. BREMNER,

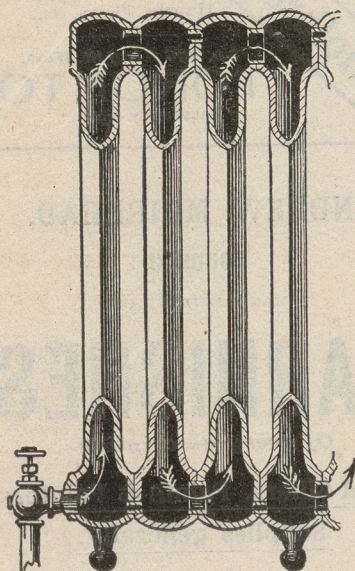
Importer Building Supplies
50 Bleury Street. MONTREAL.

THE CANADA RADIATOR COMPANY, LIMITED

Manufacturers of the "Canada" and "Ontario" Radiators

THE ONLY RADIATOR HAVING POSITIVE CIRCULATION

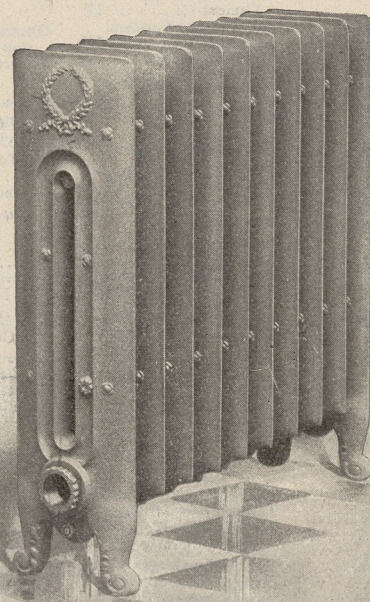
124 Bay Street, TORONTO, CANADA



SECTIONAL VIEW SHOWING CONSTRUCTION AND CIRCULATION OF THE "CANADA."

ALL DESIGNS ARE REGISTERED AND THE CONSTRUCTION PATENTED.

The "Canada" and "Ontario" Radiators are the only ones made that are adapted for use in both a steam and hot water plant.



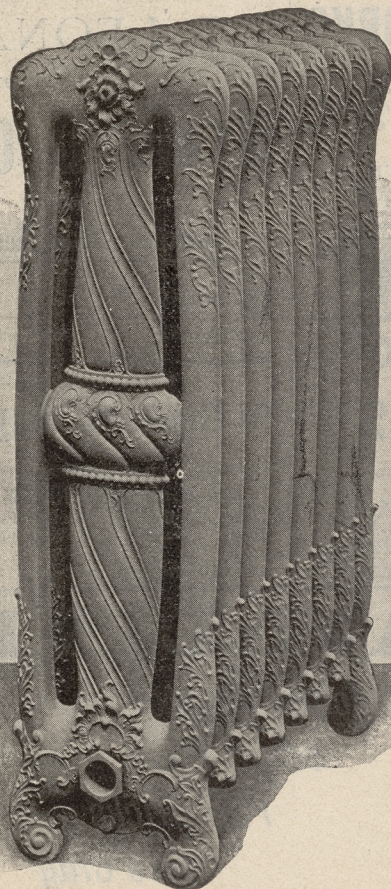
"CANADA" PLAIN.—26 Inches High

The "Canada" are perfection in both their construction and style.

No other steam radiator has any adequate means of drawing off air from the inner loops. There are no cold ends in the "Canada" steam radiators because the air is driven off as the steam enters.

STEAM AND WATER

STEAM AND WATER



"CANADA" THREE COLUMN.



"CANADA" ORNAMENTED.

CANADA RADIATOR COMPANY, Limited, TORONTO

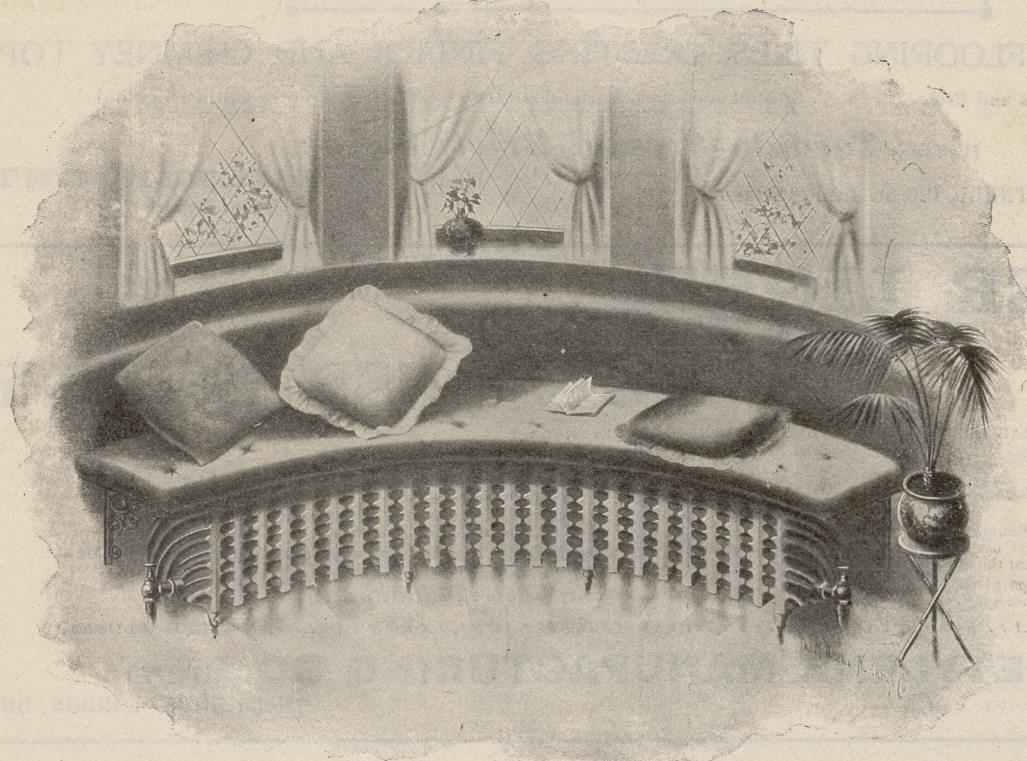
THE CANADA RADIATOR COMPANY, LIMITED

Manufacturers of the "Canada" and "Ontario" Radiators

THE ONLY RADIATOR HAVING POSITIVE CIRCULATION

All Designs are Registered and Construction Patented

124 Bay Street, TORONTO, CANADA

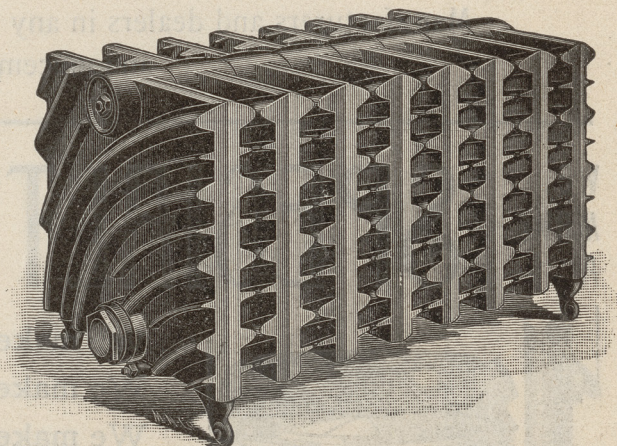


The "Canada Window Seat" Radiator is so constructed that the cold air enters at the bottom of the radiator and after being heated by passing through the flues discharges into the room at the front.

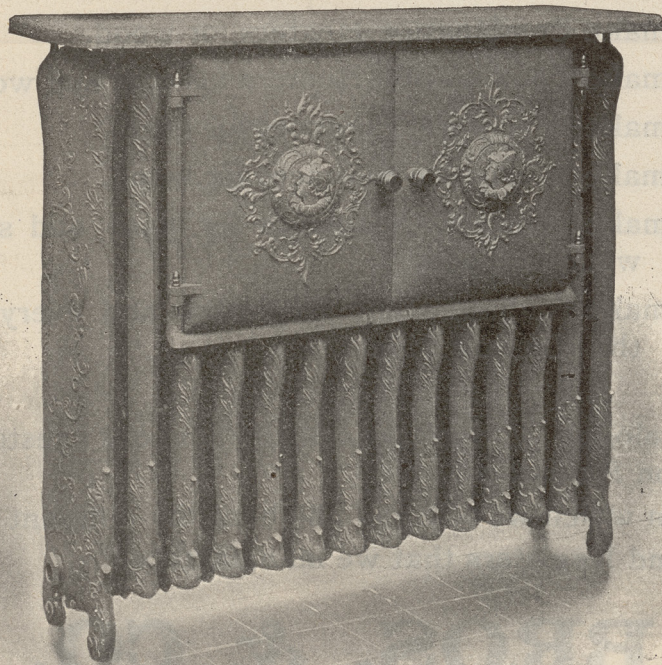
This is the only radiator that will give satisfactory service under a seat. Can be built to fit any angle or curve. Is adapted for use in both Steam and Hot Water.

"CANADA WINDOW SEAT."
FOR STEAM AND WATER

The joints of our Radiators are Iron to Iron, without gaskets of any kind, and are absolutely indestructible, yet one of our Radiators can be altered readily by a steam fitter on the premises and that too after having been in use.



"CANADA WINDOW SEAT."



DINING ROOM RADIATOR.

By the use of the "Canada" you get a maximum service at a minimum cost.

SEND FOR CATALOGUE

**Canada
Radiator
Company
Limited**

124 Bay Street

- TORONTO

The Toronto Pressed Brick and Terra Cotta Works

BRICKS

ROOFING AND FLOORING TILES, CRESTING, FINIALS AND CHIMNEY TOPS

Send for Samples and Prices.

* Special and prompt attention given to Architects' Terra Cotta Drawings.

Write: **Toronto Pressed Brick Works**

Montreal Agent: E. F. DARTNELL, 180 St. James Street.

Head Office: **MILTON, ONT.**

C. J. LEWIS, Proprietor.

BETTER LIGHT AND MORE OF IT FOR LESS MONEY



THE FOLLOWING IS A PARTIAL LIST OF THE GOODS WE MANUFACTURE : : : :

The Sun Lighting Machine—
(Sprinkling System).

The Beacon Acetylene Machine—
(Immersion System).

The Simplex Acetylene Generator—
(The best and cheapest machine made for supplying a moderate number of lights. Just the thing for summer cottages).

Special Photographic Apparatus—
(Beats sunlight for photography).

The Duplex Acetylene Machine—

(The only machine that will supply both light and heat from one and the same machine).

Acetylene Gas Stoves and Ranges—
(For use with the above machine).

Apparatus for Lighting Railway Cars and Engine Head-Lights—

The "Crescent" Acetylene Burner.

Acetylene Gas Meters, etc., etc.

WE ALSO MAKE A SPECIALTY OF LIGHTING TOWNS AND VILLAGES, LARGE BUILDINGS AND BLOCKS.

THE **ACETYLENE MANUFACTURING CO., LIMITED**

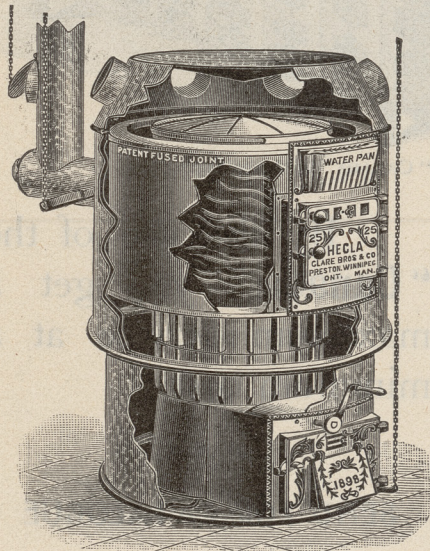
WE GUARANTEE EVERYTHING WE MAKE.

Head Office: LONDON, ONT.

Manufacturers and dealers in any kind of Building Materials should have an announcement in these pages.

WE
MAKE
A

SPECIALTY OF HEATING



We make Hot Water Boilers for coal.

We make Hot Water Boilers for coal and wood.

We make Combination Heaters for coal.

We make Combination Heaters for wood.

We make Combination Heaters for coal and wood.

We make Warm Air Furnaces for coal.

We make Warm Air Furnaces for wood.

We make Warm Air Furnaces for hard and soft coal, wood and peat.

We make Radiators and Registers and everything in the Heating Line

Send for our New Hot Water Catalogue in which we tell all about our Preston Boiler and New Steel and Cast Iron Radiators.

Send for our Furnace Catalogue in which we tell you all about the different styles of Coal and Wood Furnaces and Registers that we manufacture.

CLARE BROS. & CO.

Winnipeg, Man.

Preston, Ont.

CANADA'S LARGEST RADIATOR MANUFACTURERS

SAFFORD RADIATORS

FOR STEAM OR HOT WATER HEATING

Lead the World

NEVER BEATEN BY COMPETITION

NEVER EQUALLED IN MERIT



*Safford
Florence*

Only Radiator with pipe threaded joints.



Only Radiator on the market constantly for 15 years.



Only Radiator on the market with an absolutely free unobstructed circulation.



Made with or without diaphragms.



Our latest designs are "Ontario" and "Canadian Ideal," protected under design and trade mark each.

THE
DOMINION RADIATOR COMPANY
LIMITED
TORONTO AND MONTREAL

LARGEST RADIATOR MANUFACTURERS UNDER THE BRITISH FLAG.

ALBERT MANUFACTURING CO.

MANUFACTURERS OF

PATENT

ROCK WALL PLASTER

HILLSBOROUGH, N. B., CANADA



MANUFACTURERS OF

"HAMMER BRAND"

CALCINED PLASTER

DIRECTORY OF LEADING STONE AND GRANITE DEALERS

THE LONGFORD QUARRY CO.
Longford Mills, Ont.
Dealers in All Kinds of
BUILDING, BRIDGE AND DIMENSION
... STONE ...

C. PICKARD
BROWN STONE
LARGE DIMENSION STONE
A SPECIALTY
SACKVILLE, N.B.

GRANITE
Red and Rose Pink
Fine Rich Colours for
BUILDING and MONUMENTAL PURPOSES
and **GRANITE PAVING**
can be had at low figures from the
St. Phillipe d'Argenteuil Quarries.
Send for quotations and samples to
JOS. BRUNET
Cote des Neiges, Montreal, Que.

GRANITE
STANSTEAD Granite for Building purposes.
The finest and most enduring Building Stone on the
market.
Estimates given on Architects' plans.
THE STANSTEAD GRANITE QUARRIES CO. LIMITED
Beebe Plain, Que.

JAMES BRODIE & CO.
Quarriers and Manufacturers of . . .
CANADIAN QUINSY, EBONY
AND STANSTEAD GRANITE
Monumental Building, Curbing, Pav-
ing, etc. - Rough Stock a Specialty
Mount Johnson, Que.

D. ROBERTSON & CO.
Credit Forks Quarries.
BROWN AND GREY
FREESTONE
Sills, Heads, Coursing and Dimension Stone
our Specialties. Lime Works at Milton, Ont.
Offices: **Toronto, Credit Forks and Milton**

For Prices of Unoccupied Spaces in the above Directory address the CANADIAN ARCHITECT AND BUILDER, Toronto.

CREDIT FORKS STONE CO.

84 Adelaide St. W.

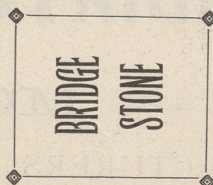
TORONTO

Brown Stone Quarries,
✠ ✠ ✠ **Credit Forks Ont.**

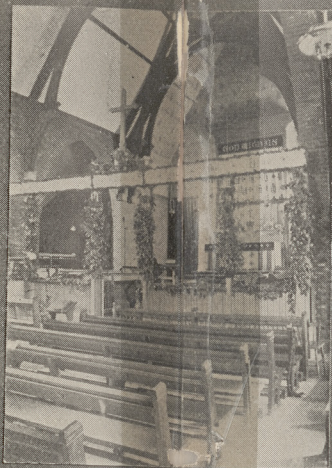
Supply the
Best . . .

BROWN STONE IN . .
CANADA

DIMENSION **COURSING**
RANDOM **SHODDY**
HEADS, SILLS **RUBBLE**

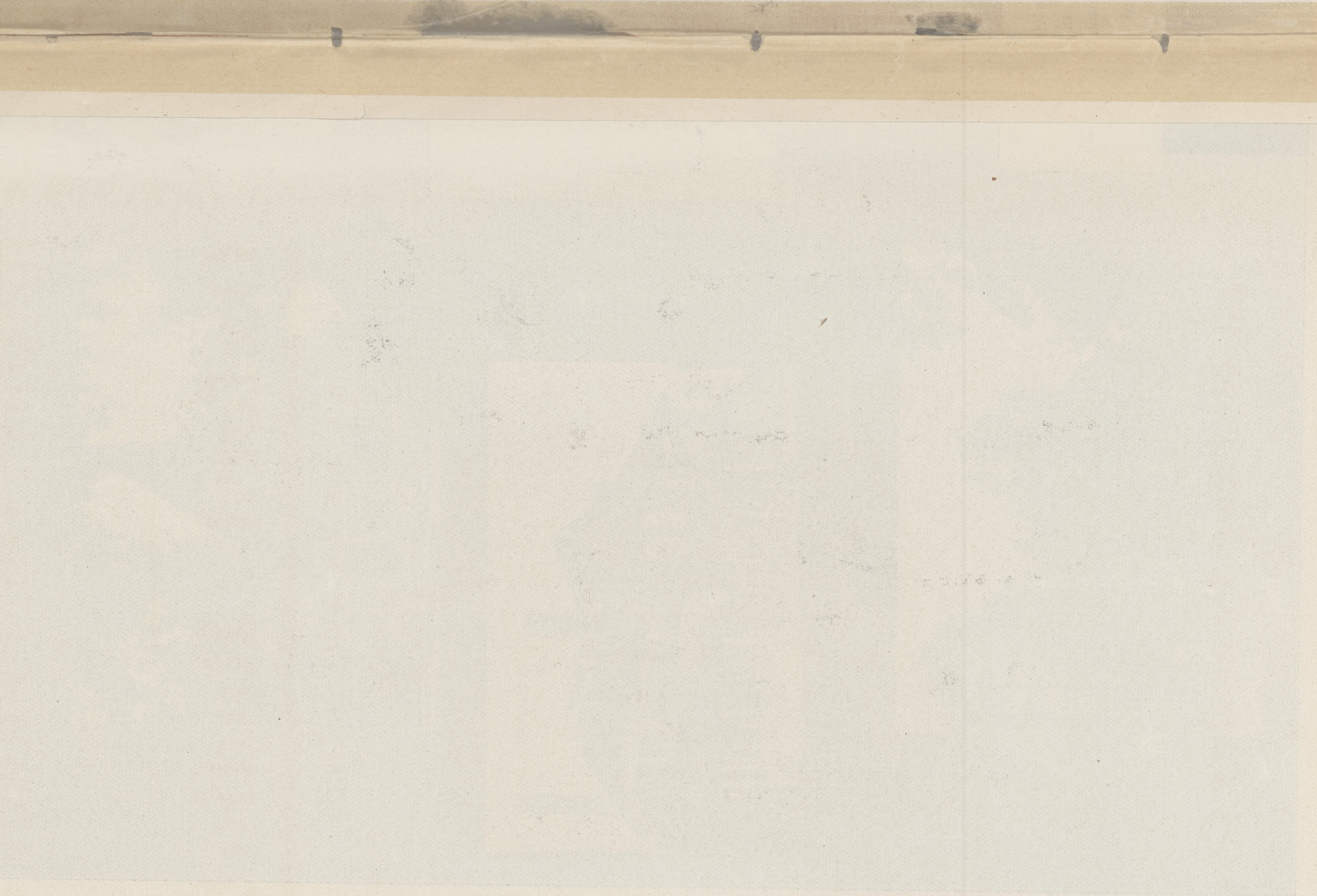
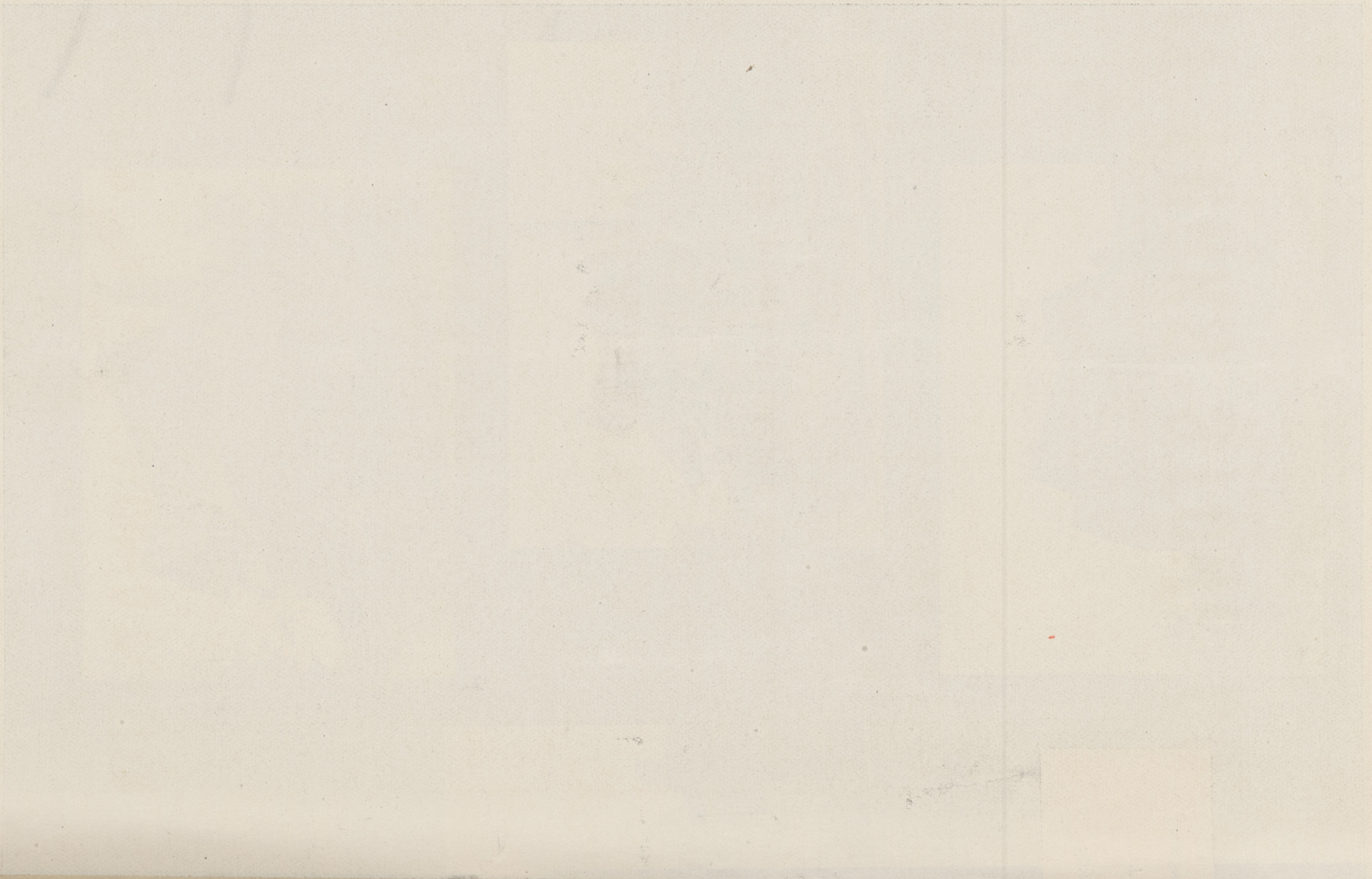


OFFICE:
84 Adelaide St. W.
TORONTO
Telephone 208.



SOME HOUSES
IN
TORONTO.
EDEN SMITH, ARCHITECT.



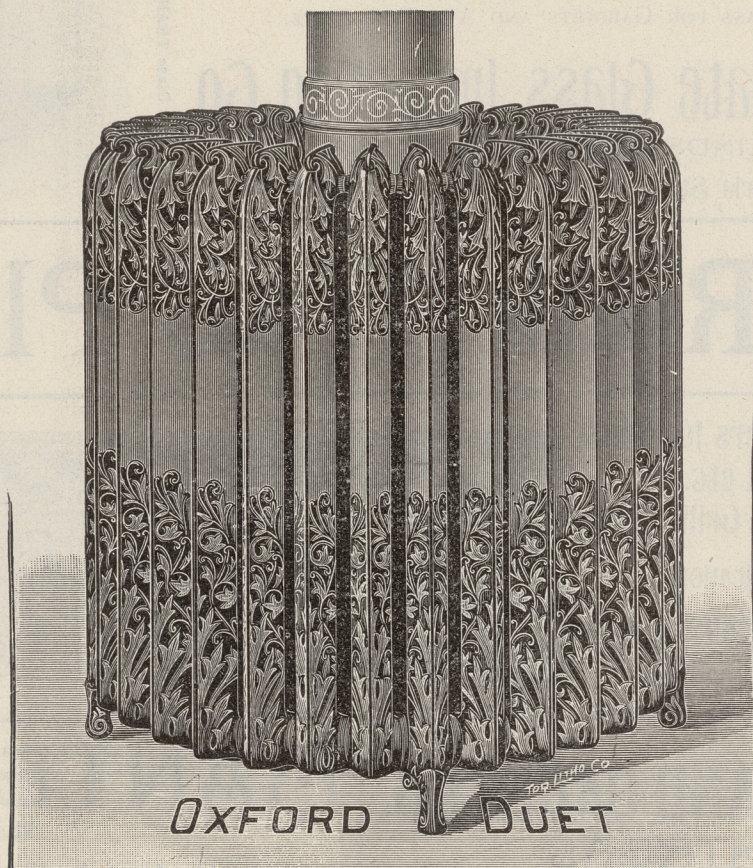


RADIATOR PERFECTION

Graceful Design—Mechanical Excellence—and an immense scope of choice in sizes and shapes—are offered you in

Oxford Radiators

For Hot Water or Steam



They have won world-wide prestige—equally suited for private or public buildings.

Leakage is impossible—they have iron to iron joints, one unique feature of superiority.

Consult us, or our catalogs, for fullest information.

The Gurney Foundry Co., Limited
 TORONTO WINNIPEG VANGOUVER

THE GURNEY-MASSEY CO., Limited - MONTREAL

ELEVATORS

Any desired capacity.

MILLER BROS. & TOMS
MONTREAL

Any service. Any motor.

BENT GLASS

MANUFACTURERS

FOR { **Shop Fronts**
House Windows
Show Cases

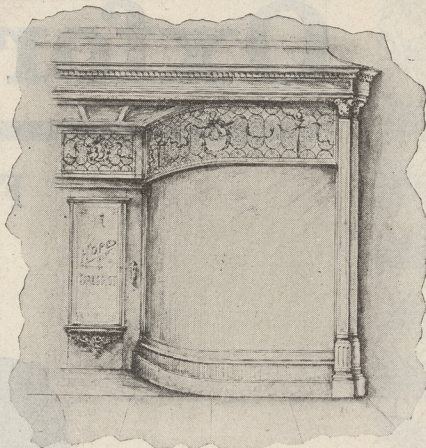
FINE BENT GLASS FOR CABINETS AND ART FURNITURE.

Toronto Plate Glass Importing Co.
ALL KINDS OF WINDOW GLASS,

135 and 137 Victoria St.

TORONTO

Refractory Glass TRANSOMS for Light Diffusion.



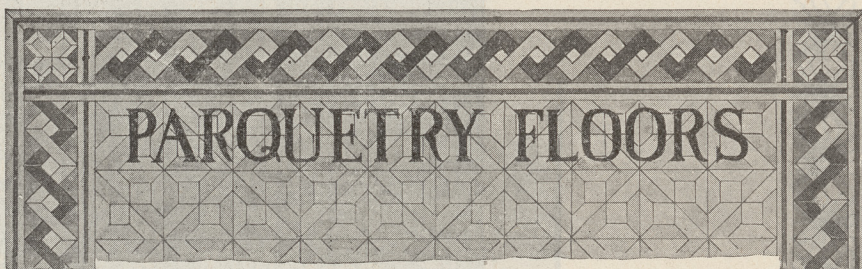
Use Rock Wall Plaster

Wood Carpet, Borders for Rugs
Wainscoting, etc.

Turned and Twisted Grille Work

Designs on application.

ELLIOTT & SON COMPANY, LIMITED
MANUFACTURERS
79 King St. West, TORONTO



THE WIRE AND CABLE CO.
MONTREAL

Manufacturers of . .

Telephone, Telegraph,
and Electric Light . . **Conductors**

OUR
NEW CATALOGUE
IS NOW READY.
Illustrated. Complete. Original.
DENNIS WIRE AND IRON CO. LONDON
ONT.

MANTELS

in WOOD, BRICK and TILE

Grates, Andirons, Fenders,
Floor and Wall Tiles.

NEWEST DESIGNS AT LOWEST PRICES.

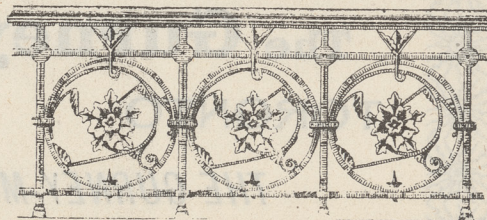
THE CHARLES ROGERS & SONS CO. LIMITED

97 YONGE STREET, TORONTO

TORONTO FENCE & ORNAMENTAL IRON WORKS

Contractors
for

IRON
STAIR-
CASES



NEW COURT HOUSE, TORONTO

Estimates given for work in Iron, Brass or Bronze.
'Phone 15

JOSEPH LEA, Mgr.
99 and 101 Queen St. East, TORONTO

POSSIBILITIES OF HOUSE COOLING.

Nowhere in the world have so much thought and energy been applied to the perfecting of methods of heating dwelling houses as in the United States, and the people here, says an exchange, are probably the best warmed people of any in a similar latitude on the face of the globe. For relief from the extremes of hot weather, however very little has been done here, and, in fact, it is by no means certain that there is a feasible method of cooling small houses. Of course, large places of entertainment, where there are blower systems, can be readily tempered in hot summer weather, but the private house does not offer such an easy problem from an economical standpoint. The matter has been given somewhat more attention abroad, and an interesting paper was presented at a recent meeting of the Heating and Ventilating Congress in Munich by Dr. Bruckner, who explained that the most feasible means of cooling were through ammonia or carbonic acid, which took up heat as they expanded. He likened ammonia to a sponge, which, expanding in a warm atmosphere, took up the heat, which could be thus carried away and squeezed out of the ammonia by compression outside. The

same thing is true of carbonic acid, though ammonia was preferred as being cheaper to work and also in case of leakage being instantly detected. In operation the ammonia gas was compressed in a machine and cooled, and thus brought into liquid form. On being allowed to expand it falls to a very low temperature, and may then be used either direct as a cooling agent or through the medium of salt water. For ordinary house cooling ribbed pipes through which the cold liquid is passed were used. Machinery is required, of course, to accomplish these several ends of compression and distribution, and this is an almost insuperable objection to the employment of such a method in a private residence, except in those palatial ones which include power plants for elevator service and lighting. Dr. Buckner described, however, one house in Germany which had a regular system of cooling operated by a 3 horse-power electric motor. The house was in Frankfort, and the system has been working for five years, salt water being cooled and carried through pipes in the ceilings of the dwelling rooms, the ceilings being perforated with narrow slits through which the air as it was cooled fell into the room. Being an electric motor it was easily handled, and, in fact, the only attention given to it was by the woman cook. It is estimated that the entire outfit cost about \$5,000, and the power for running it was estimated at about \$75 a year. The smaller charges incidental to the machinery were not included.

Canada Foundry Company

TORONTO, ONT.

Limited

(SUCCESSORS TO ST. LAWRENCE FOUNDRY COMPANY OF TORONTO)

Engineers, Founders and Machinists

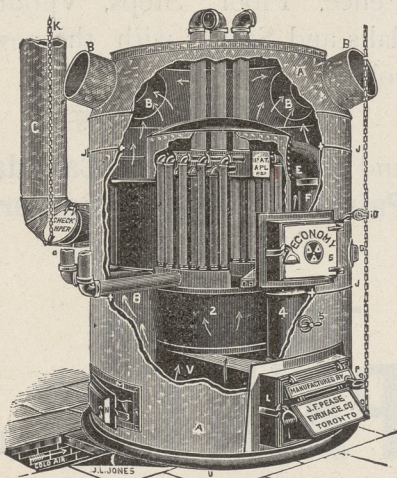
STRUCTURAL IRON ^{AND} STEEL WORK

Beams, Channels, Angles, Tees and
Cast Iron Columns always in stock.

WRITE OR 'PHONE FOR ESTIMATES AND PRICES

EVERY SQUARE INCH

Of surface in the Boiler of this Combination Heater is exposed to the direct rays of the fire. The Boiler is made throughout of extra heavy materials, thoroughly tested. Water ways are vertical. The Boiler is entirely out of the way when putting in fuel. A thoroughly first-class Hot Water Combination Heater and worthy of the confidence of those buyers who want the best Heater of this class obtainable anywhere.



ASK FOR CATALOGUE AND ESTIMATE

J. F. Pease Furnace Co., Limited

189-193 Queen Street East

TORONTO, ONT.

NEW FIRE BY-LAWS AT OTTAWA.

The City Council of Ottawa have adopted a new fire by-law, which provides that buildings within fire limits A and B shall be covered with shingles, whether laid with or without mortar, but the roofs of all buildings within the said area shall be externally finished with tin, iron, zinc, copper, slate, tile, felt and gravel, or some other material of an incombustible nature, and any buildings or structures erected within said fire limits shall be placed on stone, brick or concrete foundations. Not more than half a million feet of lumber shall be piled or stored in any lumber yard or by any person or firm within the area of fire limit A, as defined and described in the said by-law. Where any quantity of lumber not exceeding half a million feet is piled or stored in any part of the said city of Ottawa, the same shall be so piled or stored as to leave a vacant space on all

sides of the said lumber of not less than ten feet between the same and any property.

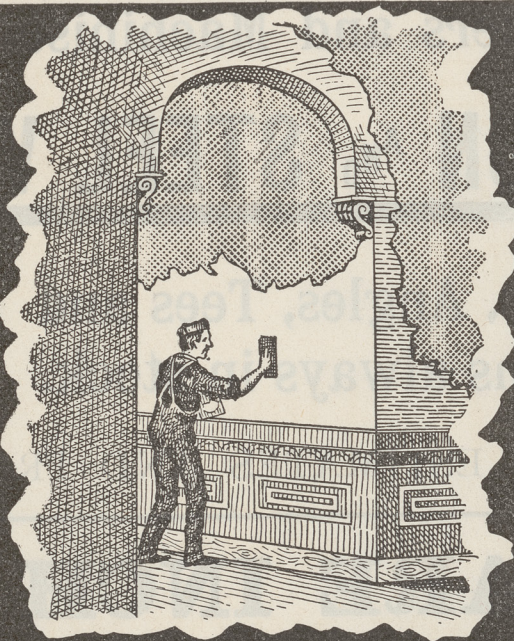
No greater quantity of lumber than half a million feet shall be piled or stored in any lumber yard or by any person or firm anywhere outside area A unless so piled as to provide a vacant space on all sides of the said lumber between the same and any property of not less than sixty feet.

The ageing of timber, which formerly required long storage, is now completed by electricity in a few hours. In the Nodon-Bretonneau process the timber is piled on a lead frame in a large wooden vat, is nearly immersed in a chemical preparation, and is covered over by shallow vessels of water having porous bottoms of felt and linen. The positive pole of a dynamo is connected to the lead frame

and the negative pole to the water vessels. On the passage of the current, the sap is driven to one side of the wood and expelled, and the chemical liquid enters the pores and takes its place. After drying the wood is ready for use.

A WELL KNOWN AND THOROUGHLY competent man is open to engagement as Builder's Manager, Building Superintendent or similar position. Exact measurer and figurer for all trades, and has had 20 year's experience in office and on works in England and America. Used to control large bodies of men, &c. Apply "H," Room 38, Imperial Building, Montreal.

THE PEDLAR PEOPLE



Plaster on Steel Lath

Pedlar's Expanded Steel Lath has a good key.
That's its strong point.
The mesh is very open.
That's what makes it's key so good.

Takes more mortar than others, to be sure, but this is an advantage, as the open mesh allows enough mortar to pass through to completely embed the lath, making it entirely fireproof.

Have you one of our large Catalogues?

Gladly sent—express paid—on request, by mentioning the "Canadian Architect."

OSHAWA ONT.

KHAKI!

KHAKI!!

KHAKI!!!

Have you seen it?
Seen what?



KHAKI
FLOOR
PAINT

24 QTS. OR 12½ GALS.
24 IN A CASE.

Order a case. No advance in regular price.

For a good effect, paint the Fence, Floor, Steps, Verandahs and Stoops with the new color,

KHAKI

and trim with the **Canada Paint Co.'s Maroon Border.**

THE CANADA
PAINT Co'y
Limited.
MONTREAL - TORONTO



Write for Color Cards.

The Canadian building at the Paris Exposition is being severely condemned on account of its poor design and material and faulty construction. The blame in this instance rests with the British authorities, as both the architect and contractor were appointed by the colonial committee. It is much to be regretted that a competition for designs among Canadian architects was not instituted, in order that the building might typify the development achieved by Canada in architecture.

The city solicitor of Ottawa has advised the council that they have exceeded their powers in connection with the new plumbing by-law recently adopted. He states that the municipal act only confers the power to prevent unqualified persons from undertaking plumbing work but does not empower the council to pass by-laws regulating the construction of buildings or to require the licensing of drain layers. It is in the last mentioned particulars that the Ottawa by-law is declared to be ultra vires.

HIGH CLASS BUILDING MATERIALS

ORNAMENTAL IRON WORK

Electro Bronze and Bower
Barff Finish
Grilles, Counter Rails
Elevator Enclosures

MARBLE MOSAIC FLOORING

Italian Marble
Special Designs
High Class Work

LUXFER

NEW YORK HYDRAULIC PRESS BRICK

New Patterns
New Colours
New Effects

LUXFER PRISMS

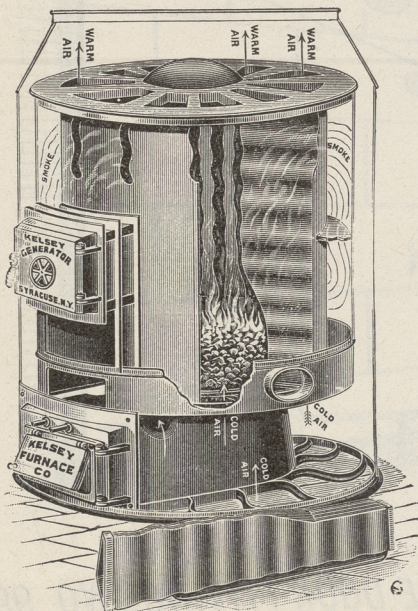
PRISMS

ARCHITECTURAL TERRA COTTA

Artistic Designs
Regular Colors
Quality Guaranteed

LUXFER PRISM CO., Limited, 98-100 King St. West
TORONTO

A Heat Maker.
A Fuel Saver.



Note Carefully:—

Formation of Fire Pot,
Large Heating Surface,
Great Air Capacity.

WARM AIR HEATING

VS.

HOT AIR OR HOT WATER

SHALLOW LAKE, ONT., May 29th, 1900.

MESSRS. THE JAMES SMART MFG. CO., Brockville, Ont.

DEAR SIR,—Acknowledging your favor of the 16th inst., I am pleased to say that I have had the greatest satisfaction with the No. 4 “KELSEY” which your agent, Mr. Webster, installed in my house last summer. The house (two stories 42 x 52 feet) is built on a small island in Shallow Lake, and is in a very exposed position, still the “KELSEY” heated same perfectly last winter, during the coldest weather, with a minimum fuel consumption, in fact during the entire winter, practically, the check damper in smoke pipe was open. My former house, which was burned a year ago, was heated by a hot water system, and although it gave fairly good results, I have no hesitation in giving the preference, even at the same cost, to the “Kelsey.” I have had experience with other hot air furnaces, which were far from satisfactory, and would not place such furnaces in my house for ten times the cost. To sum up, the “KELSEY” gives me at a moderate cost, the maximum of comfort, and I would not exchange it for any heating and ventilating system I know of. It will not fail to meet your utmost expectations.

Very truly yours,
R. P. BUTCHART

Kelsey Warm Air Generators

ASSURE FOLLOWING ADVANTAGES: Large Saving in Fuel; Warm House and Cool Cellar; Freedom from Gas and Dust; Mild, Warm, Healthful Air; Distant Rooms Positively Heated; More Years without Repairs.

Our Kelsey Booklet tells all about it. Write for one.

The **James Smart Mfg. Co., Limited, Brockville, Ont.**

EXCLUSIVE MAKERS FOR CANADA

CANADIAN OFFICE & SCHOOL FURNITURE CO. LIMITED
PRESTON, ONT.



OFFICE, SCHOOL, CHURCH, & LODGE FURNITURE

FINE BANK, OFFICE, COURT HOUSE, AND DRUG STORE FITTINGS A SPECIALTY

SEND FOR CATALOGUE

TENDERS WANTED

A Weekly Journal of advance information and public works.
 The recognized medium for advertisements for Tenders.

CANADIAN CONTRACT RECORD
TORONTO.

SEATING

FOR
**Churches
 Schools and
 Opera Houses**

Hardwood Fittings

FOR
**BANKS, OFFICES
 STORES and RESIDENCES**

If You are Building or Refurnishing our Designs would Interest You.

THE **GLOBE FURNITURE CO.'Y, LIMITED**
 MANUFACTURERS
WALKERVILLE, ONT.

Quebec Architects.

A. RAZA,
Architect and Valuator,
 Street Railway Chambers, - MONTREAL.
 Telephone Main 961.

HUTCHISON & WOOD,
Architects and Valuators,
 181 St. James Street, - MONTREAL.
 Telephone Main 858.

H. STAVELEY,
ARCHITECT
 Member Province of Quebec Association of Architects.
 113 St. Peter Street, - QUEBEC.

A. F. DUNLOP, R. C. A.
Architect and Valuator,
 Member Province of Quebec Association of Architects.
 185 St. James Street, Temple Building,
 Telephone Main 1627. - MONTREAL.

WRIGHT & SON,
Architects and Valuators,
 Members Province of Quebec Association of Architects.
 204 St. James Street, - MONTREAL.

A. T. Taylor, F.R.I.B.A., R.C.A.
TAYLOR & GORDON,
ARCHITECTS
 43 St. FRANCOIS XAVIER ST. - MONTREAL
 Telephone Main 2817.

A POINTER FOR YOU Our Balanced Folding Partition Fixtures please all who use or specify them.

A postal will get particulars.

O. T. Springer, BURLINGTON, ONT.

PORTLAND CEMENT

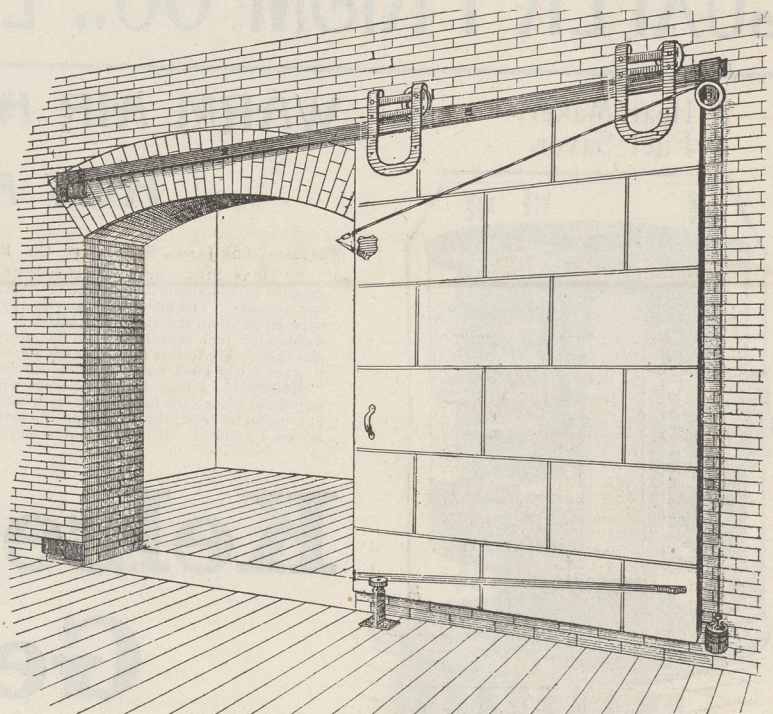
For Sidewalks, Pavements, Heavy Masonry and Concrete.

MANUFACTURED BY . . .

Write for Circular and Prices.

The Rathbun Company
 DESERONTO, ONT.

Please mention THE CANADIAN ARCHITECT AND BUILDER when corresponding with advertisers.



"ACME AUTOMATIC FIRE DOOR FITTINGS NO. 99"

We manufacture the Best Kinds made of Acme Automatic Self-Closing Fire Door and Shutter Fittings. Write us for Catalogue and Prices. Save Insurance.

The Vokes Hardware Co., Limited, Cor. Yonge and Adelaide Sts., Toronto

Write to **Mica Boiler Covering Co., Limited**

FOR PARTICULARS AND SAMPLES OF

MICA BOILER COVERING
MICA PIPE COVERING



MICA SECTIONAL COVERING
MICA CEMENT

ENGINE PACKINGS, OILS, WASTE, ENGINEERS' SUPPLIES

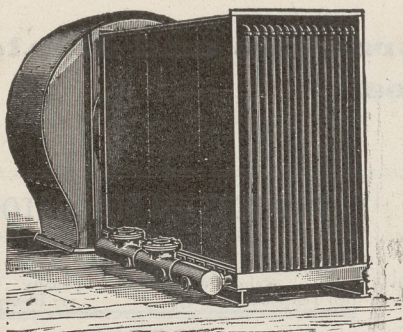
Address **Mica Boiler Covering Co., Limited.**

86-92 Ann Street, MONTREAL, QUE.

Union Bank Chambers, TORONTO, ONT.

LONDON, ENG

DRY KILNS



Economy of steam and power secured by the use of fans and heaters for drying all kinds of lumber.

Lumber is not stained when drying, and checking is prevented.

For Specifications and Particulars write to

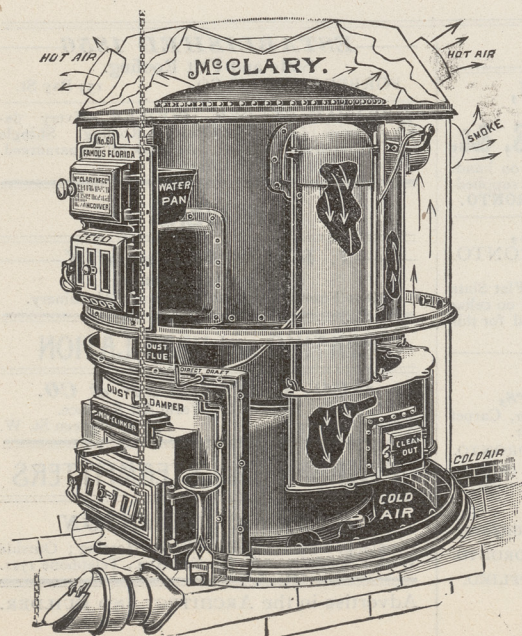
GEO. W. REED & CO.

=

MONTREAL

GUARANTEED COMFORTABLE HOMES
ARE ONLY OBTAINED BY USING A

FAMOUS FURNACE



"FAMOUS" FLORIDA COAL FURNACE

Practically a large first-class Base-burner and as economical as one.
Has Direct and Indirect Drafts.

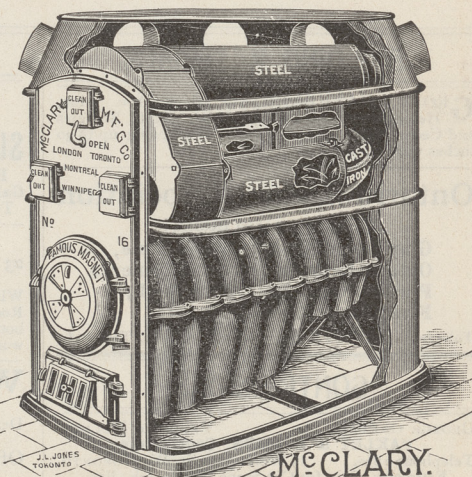
"FAMOUS MAGNET" WOOD FURNACE

Fire Box and Linings made extra heavy.

All bolts on the outside, away from the action of the fire.

Fire travels three times the length of the fire-box before entering smoke pipe.

Direct and Indirect Draft.



GAS AND DUST PROOF

ESTIMATES FOR HEATING CHEERFULLY GIVEN

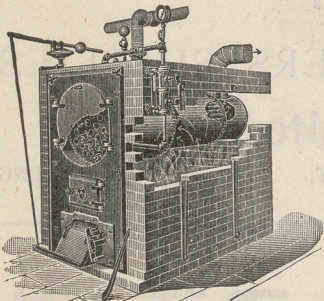
THE McCLARY MFG. CO.
LONDON TORONTO MONTREAL WINNIPEG VANCOUVER

Galvanized Iron Goods

Corrugated Conductor Pipes and Elbows.
Corrugated Sheets, all sizes.
Eavetroughs, all sizes and styles.
Cornices, Skylights, &c.

WHEELER & BAIN - TORONTO

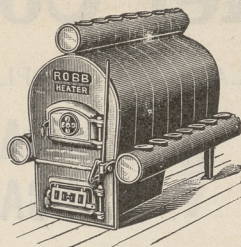
VANCE BOILERS FOR STEAM AND HOT WATER HEATING



Manufactured of Steel Boiler Plate.
The most complete and perfect Boiler
for the purpose now on sale. Illustration
shows at once the economy.

Used in Public Buildings, Residences,
Colleges, Mercantile Houses, Churches, Opera
Houses, Hotels, Banks, etc. Contractors, Archi-
tects and users send for Catalogue and discount to

E. LEONARD & SONS,
Engine and Boiler Manufacturers - LONDON, ONT.



ROBB HEATERS

WILL BURN

ANY KIND OF FUEL

Hard coal is the only fuel that can be used successfully in the ordinary hot water heater. If soft coal is used, the soot must be removed every day or two. This is seldom properly attended to, and as soot is a non-conductor of heat, much fuel is wasted.

The heating surfaces of the **ROBB HEATER** are so arranged that soot cannot collect, and any kind of fuel can, therefore, be used in the most efficient manner.

ROBB ENGINEERING COMPANY,
LIMITED
AMHERST, N. S.

Classified Directory of Montreal Contractors and Dealers in Builders' Supplies

BUILDING MATERIALS

E. F. DARTNELL,

Stone, Pressed and Common Bricks, Mineral Wool, etc.
Telephone 2382. 180 St. James Street.

T. A. MORRISON

Pressed and Paving Bricks, Porous Terra Cotta, Stone, &c. Telephone 2147. 118 St. Peter Street.

GEO. A. COWAN,

Building Supplies,
Office, 59 Temple Building.
Telephone 2463.

NEW ROCKLAND SLATE CO.

Roofing Slate and Slate Slab Work of all Descriptions.
Telephone 551. 377 St. Paul street.

JAS. W. PYKE & CO.

Importers Structural Material—Iron and Steel
Telephone 312. 35 St. Francois Xavier Street.

BUILDERS and CONTRACTORS

J. BENJAMIN DAGENAIS

210 Guy St. - BUILDER - Montreal
Specialty—Ornamental Metal Ceiling. Tel. Main 3099.

JOHN QUINLAN, General Contractor and Builder,
679a Wellington St., Montreal. Estimates given
on all kinds of Cut Stone and Masonry; Jobbing
promptly attended to. Bell Telephone 8275.

PLUMBERS and STEAMFITTERS

JAMES BALLANTYNE

Practical Plumber, Gas, Steam and Hot Water Fitter,
153 St. Antoine St., Montreal. Bell Telephone 2462.

Subscribe for the ARCHITECT AND BUILDER.

PAINTERS and DECORATORS

JOHN B. OWENS

House, Sign and Decorative Painter; Paper Hanger.
Natural Wood Finish a Specialty.
Bell Telephone No. 2237. 117 Bleury Street.

ROOFERS

D. NICHOLSON & CO., Roofers, 679 St. Paul
Street, Montreal. Gravel Roofing a Specialty.
Repairs of all kinds promptly attended to.
Bell Telephone 1665.

Write for prices for a card in
this Directory.

Classified Directory of Toronto Contractors and Dealers in Builders' Supplies

BUILDING MATERIALS

GEORGE RATHBONE, 2 Northcote Ave. Pine,
Hemlock and Hardwood Lumber; Lath, Shingles
and Cedar Posts; Sawn Veneers. Re-sawing up to 30
inches wide a specialty.

Ontario Lime Association

Manufacturers and Dealers in

Grey Lime, Guelph White Lime,
Ontario Cement, Portland Cements
Plaster Paris, Hair, Fire Brick,
Fire Clay, Sewer Pipe, etc.

Telephone 920. 118 Esplanade St. E., Toronto

CONTRACTORS

GEORGE OAKLEY. **FREDERIC HOLMES.**
OAKLEY & HOLMES, Contractors
Telephone 1830. 89 Wellington St. W., TORONTO.
Estimates given for Cut Stone, Brickwork, Etc.

MANTLES, GRATES and TILES

Toronto Hardware Mfg. Co.
1100 Queen St. W.
ALSO PLUMBERS' SUPPLIES.

ROOFERS

ROBT. RENNIE & SON,

Terra Cotta Tile,
SLATE and GRAVEL ROOFERS, &c.

Every description of Roofing Slate always on hand.
Galvanized Iron Ridges, Valleys and Flashings supplied.
Telephone 2344. 378 Berkeley St., TORONTO.

H. WILLIAMS & CO.,

23 Toronto St. - TORONTO.

ROOFERS

With Slate, Felt and Gravel; also Williams' Flat Slate
Roof—the best. We lay ROCK ASPHALT on cellar
bottoms, floors and walks—the best material for this
work. Telephone No. 511.

W. T. STEWART & CO.

Felt and Slate Roofers,

Dealers in Felt, Pitch, Tar, Sheathing Paper, Carpet
Paper, and all kinds of Building Paper.
Office: Cor. Adelaide and Bay Sts., TORONTO.
Estimates furnished. Telephone No. 698.

G. DUTHIE & SONS,

Terra Cotta Tile, Slate and Felt Roofers,
Cor. Widmer and Adelaide Sts., - TORONTO.
GALVANIZED IRON FURNISHINGS SUPPLIED.
Telephone 1936.

ESTABLISHED 1856

Slate and Felt Roofing.
FORBES ROOFING CO. 153 Bay St.

ABRAHAM SNYDER, ROOFER.—Every de-
scription of Gravel and Shingle Roofing. Shingle
Roofs painted and repaired. All work fully guaranteed.
Office, 114 Westmoreland Avenue.

MOVERS

I. WARDELL & SON

450 Spadina Avenue,
Move Frame and Brick Houses and Machinery.

HEATING and VENTILATION

GEO. E. YEOMAN & CO.

Mfrs. "ROYAL" Warm Air Furnace.
Telephone 2034. 279 Queen St. W.

PLUMBERS and STEAMFITTERS

BATES & ROBINSON

Plumbing, Steam and Hot Water Heating; Outside
Work a Specialty. 385 Spadina Ave., Telephone 1721.

Advertise in the ARCHITECT AND BUILDER.



CANADIAN ARCHITECT AND BUILDER.

VOL. XIII.—No. 7.

JULY, 1900

{ PRICE 20 CENTS.
\$2.00 PER YEAR.

—THE— CANADIAN ARCHITECT AND BUILDER,

A Monthly Journal of Modern Constructive Methods,
(With a Weekly Intermediate Edition—The CANADIAN CONTRACT RECORD).

PUBLISHED ON THE THIRD WEDNESDAY IN EACH MONTH IN THE INTEREST OF
ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS,
DECORATORS, BUILDERS, CONTRACTORS, MANUFACTURERS OF AND DEALERS IN BUILDING
MATERIALS AND APPLIANCES.

The C. H. MORTIMER PUBLISHING CO. of Toronto, Limited,
Publishers,
Confederation Life Building, - TORONTO, CANADA.
Telephone 2362.

Branch Office: NEW YORK LIFE INSURANCE BUILDING, MONTREAL,
Bell Telephone 2299.

SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for \$2.00 per year. The price to foreign subscribers is \$2.50. Subscriptions are payable in advance. The Journal will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, will be continued until instructions to discontinue are received and all arrears of subscription paid.

ADVERTISEMENTS.

Prices for advertisements sent promptly on application. Orders for advertisements should reach the office of publication not later than the 12th, and changes of advertisements not later than the 5th day of the month.

EDITOR'S ANNOUNCEMENTS.

Contributions of value to the persons in whose interest this journal is published are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

Subscribers who may change their address should give prompt notice of same. In doing so, give both old and new address. Notify the publishers of any irregularity in delivery.

ONTARIO ASSOCIATION OF ARCHITECTS.

OFFICERS FOR 1900.

PRESIDENT	A. FRANK WICKSON, Toronto.
1ST VICE-PRESIDENT	FREDERICK HENRY, London.
2ND VICE-PRESIDENT	GRANT HELLIWELL, Toronto.
TREASURER	F. S. BAKER, A.R.I.B.A., Toronto.
REGISTRAR	W. R. GREGG, 61 Victoria St., Toronto.

COUNCIL:

J. E. BELCHER,	Peterborough.
S. H. TOWNSEND	Toronto.
W. A. LANGTON	Toronto.
J. A. PEARSON	Toronto.
A. H. GREGG	Toronto.

Communications are addressed to the Registrar.

PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

OFFICERS FOR 1899.

PRESIDENT	PROF. S. H. CAPPER, Montreal.
1ST VICE-PRESIDENT	G. E. TANGUAY, Quebec.
2ND VICE-PRESIDENT	J. VENNE, Montreal.
SECRETARY	G. A. MONETTE, Montreal.
TREASURER	W. E. DORAN, Montreal.

COUNCIL:

A. RAZA	Montreal.
J. S. ARCHIBALD	Montreal.
E. MAXWELL	Montreal.
H. STAVELEY	Quebec.
ALCIDE CHAUSSE	Montreal.
A. H. LAPIERRE	Montreal.
AUDITORS—A. R. DECARY, Montreal; R. P. LEMAY, Quebec.	

TORONTO BUILDERS' EXCHANGE.

BOARD OF DIRECTORS:

HENRY MARTIN, President.	JOSEPH RUSSELL.
THOS. CHRISTY, 1st Vice-President.	JAS. CRANG.
JAS. B. THOMSON, 2nd Vice-President.	JOHN M. GANDER.
DAVID WILLIAMS, Treasurer.	R. CHALKLEY.
THOS. CANNON, Jr.	JOHN VOKES.
GEORGE DUTHIE.	WILLIAM PEARS.
THOS. PAINTER.	W. J. HYNES.

LONDON BUILDERS' EXCHANGE.

BOARD OF DIRECTORS:

THOS CANNON, Jr., Toronto, Honorary President	THOS. JONES.
WILLIAM TYTLER, President.	JOSHUA GARRETT.
SCOTT MURRAY, 1st Vice-President.	HENRY STRATFOLD.
WILLIAM SMITH, 2nd Vice-President.	ERNEST FITZGERALD
GEO. S. GOULD, Secretary.	
JAMES LUNEY, Treasurer.	

MONTREAL BUILDERS' EXCHANGE.

BOARD OF DIRECTORS:

C. T. WILLIAMS, President.	H. R. IVES.
J. W. HUGHES, Vice-President.	T. FORDE.
G. J. SHEPPARD, Secretary-Treasurer.	N. T. GAGNON.
JOHN WIGHTON.	C. W. TRENHOLME

WINNIPEG MASTER CARPENTERS' ASSOCIATION.

BOARD OF DIRECTORS:

A. MACDONALD, President.	H. ELLIOTT, Secretary.
A. G. AKIN, 1st Vice-President.	J. G. LATIMER, Treasurer.
A. SUTHERLAND, 2nd Vice-President.	

VANCOUVER BUILDERS' EXCHANGE.

BOARD OF DIRECTORS:

E. COOK, President.	C. P. SHINDLER.
A. E. CARTER, Secretary.	K. M. FRASER.
H. A. BELL, Treasurer.	E. G. BAYNES.
T. BRADBURY.	D. SAUL.

The Manufacture of Portland Cement.

A number of new companies are being organized in Ontario to manufacture Portland cement. Investigation has shown that an abundant supply of the raw materials necessary for the purpose is to be found in various localities. Upwards of half the cement at present used in Canada, amounting to perhaps a quarter of a million barrels, is imported from Europe, so that there is room for a considerable expansion of the native industry. Care should be taken however not to increase too rapidly our manufacturing capacity lest we find ourselves in the position of producing more than we can find a profitable market for. This has been the experience in many lines of industry. As soon as it became apparent that money was being made by the pioneer manufacturers in a certain line, others crowded in to such an extent that soon there was overproduction and little or no return to those who had embarked their capital. Then followed trusts for the purpose of limiting the output and maintaining prices.

Ancient Lights.

SEVERAL ably written papers have recently been presented and fully discussed before the Royal Institute of British Architects, showing the unjust bearing of the English law relating to ancient lights. It was pointed out that the strict rights of light given by the Prescription Act are often very injurious to the development of towns, and as matters now stand an unscrupulous person has an opportunity of preventing his neighbor from using his property to the best advantage, except by payment of large compensation, and the law affords no means other than by mutual agreement to alter

folio
JNAI
C3
v. 13
Blackdon

old lights in a way that might be beneficial alike to the owner of the dominant light and to the person erecting his new building. Too often such a state of things leads to what is nothing less than levying blackmail on the building owner, who must pay what is demanded or abandon his scheme. A resolution was adopted that the Council of the Institute should seek the co-operation of the Surveyors' Association for the purpose of securing, if possible, needed amendments to the law.

Schoolroom Decoration in Ontario.

Under this title a pamphlet has recently been published by J. George Hodgins, M.A., L.L.D., Librarian and Historiographer of the Education Department of Ontario, with the sanction of the Minister of Education and the Premier of Ontario. The pamphlet is somewhat disappointing, consisting as it does chiefly of extracts on the subject of school room decoration and art in the school room from various writers and publications. The original matter comprises an introductory chapter in which the author states his belief that the exodus of boys from the country to the cities and towns is largely due to the fact there is so little that is attractive in rural schools and homes. The American practice of decorating school rooms with lithographs, prints, and photographs designed to emphasize momentous and memorable events in National History, is referred to and recommended for adoption in Canada, and the suggestion is made that the Historical Societies should interest themselves in this work. It is also pointed out that the placing of good pictures on the walls of school rooms must have an educative and beneficial effect upon the homes of the pupils. The pamphlet contains a number of illustrations of historical scenes and personages, public monuments, etc., in Canada. The book does not treat of decoration apart from pictures, and, strange to say, makes no mention of the work of the School Art Leagues, of which a score or more exist in the city of Toronto alone, and which seem destined to be organized and perform a useful work throughout the province.

School of Practical Science.

The building occupied by the School of Practical Science, Toronto, has become too small to meet the requirements of this growing institution. Every room in the building, even the storerooms, has been brought into requisition within the last two or three years, and the limit has now been reached. It has been necessary to use the hallways as draughting-rooms, and to divide up classes, thus occupying the time of two or three instructors when one would be sufficient were class rooms of proper size available. It has been suggested that, inasmuch as the Department of Applied Science and Mineralogy is complete in itself, having its own staff, suitable accommodation should be provided for it in a new building. The space which would then become available for the other departments in the present building would properly fulfil all requirements for the next twelve or fifteen years. In connection with the proposed new building, accommodation should be provided for instruction in geology of students taking the Arts Course at the University. The proposal has been made that a portion of the ground and first floors in the front of this new building should be fitted up in a manner suitable for a Museum to receive the mineral exhibits which are now distributed between the School of Practical

Science, the University and the Parliament Buildings. On account of the manner in which these exhibits are now divided up, they are of little service to the public. In all probability, when the Technical School Board shall have decided upon a new location, the building now occupied by the School will be taken down and a new structure erected suited to the above mentioned purposes.

The Evils of Unionism.

THE benefits which should have accrued to all classes of the community from the return of commercial prosperity, have been greatly restricted by numerous strikes, consequent upon the unreasonable demands of the labor unions. As usual the building industry has been a severe sufferer from these disputes. Every year the demands of the unions are becoming more excessive and tyrannical and a more alarming cause of uncertainty and disturbance to trade conditions. A constant effort is being made to reduce the hours of labor and raise the standard of wages. The greatest pay for the least work, seems to be the object aimed at. To the employer this means a constant increase in cost of production, without any compensating advantage in the way of improved workmanship, for no attempt whatever is made to establish a standard of quality for union labor. Any workman who has the wherewithal to pay his fee is admitted to membership. No proof of his ability as a workman is demanded. Unionism seeks to place all workmen irrespective of ability on the same level, by demanding that all shall be paid the same rate of wages. No incentive is given members of the union to become superior workmen, but on the contrary the system tends to discourage ambition. The leaders of organized labor are apparently too busily employed in exercising their power in municipal, provincial and federal politics, to give attention to what should be one of the most important functions of such an organization — the elevation of the standard of workmanship. The evils of the union system have reached an acute stage, and the commercial world is looking about for a remedy. Legislation has been enacted in New Zealand which forbids under penalty strikes and lockouts pending the settlement of disputes. The Minister for Labor and Industry is given power to enquire into the cause of any dispute between an employer and his workmen, or between different bodies of workmen, and to endeavor to effect an amicable settlement of the differences, failing which he may direct a public enquiry by a judge of the Supreme or District Court, or by the president of the Land Court, who has power to enter upon the premises and inspect everything calculated to throw light upon the cause of the dispute except books or statements of account. On the application of both parties to the dispute an arbitrator may be appointed, and on the application of the parties a conciliator. No power is given for the enforcement of any decision arrived at. During the five years which have passed since this legislation was put into operation, New Zealand is said to have been free from strikes and lockouts with their attendant injury to commerce. The time has come when steps should be taken by means of legislation or otherwise to put a stop to the interference to trade and national prosperity as well as the hardships imposed upon individuals and families by labor strikes. If relief cannot be had in the form of legislation, then the evils of unionism must be brought to an end by a general union of employers to embrace

all branches of industry, such as is being organized in Germany. Its programme is interesting and seems somewhat drastic. It is intended that when labor troubles break out in any one branch, delegates from all the branches of the union shall meet to consider the question of joint action. A fund for the assistance of weak employers in cases of strikes or lockouts is to be created, and a register of workmen is to be drawn up with the view of preventing strikers from obtaining employment elsewhere, while the men who made themselves particularly obnoxious are not to be employed in any case. The union also intends to put up several candidates for the Reichstag at the next elections. The effect of a perfectly organized and determined opposition on the part of employers to the unreasonable demands of the unions is to be seen in the outcome of the recent engineers' strike in Great Britain. In that conflict unionism suffered a defeat from which it will never recover, and the employers regained control of the management of their own business which had to a large extent been usurped by the labor organizations. The conciliation Bill, introduced by the Postmaster General and which has just been adopted by the Dominion parliament is based upon the English act. It provides means for the settlement of disputes between employers and employees where both parties are willing to submit the matter to arbitration. The act is a purely permissive one, and differs in this respect from the New Zealand law.

Tests of Canadian Timber.

In view of the value which has been placed by the public upon the timber tests conducted by the Forestry Department of the American Government at Washington, the Government of Ontario has made a small grant to defray the cost of preliminary tests of Canadian pine. If the results of these preliminary tests shall be of a character to warrant further expenditure and investigation along this line the necessary funds for the purpose will no doubt be forthcoming. Up to the present time, the only tests made in Ontario of Canadian timbers have been conducted at the school of Practical Science, Toronto, with material obtained from the wholesale lumber yards. There was no data available to show where the timber was grown or the conditions of growth. It is now proposed to take a further step, by selecting the timber for the tests and carefully noting the conditions of growth. For this object, Mr. J. A. Duff, of the school of Practical Science, Toronto, will spend several months of the present summer in Algonquin Park, which, as our readers are aware, is a timber reserve under the control of the Provincial Government. Mr. Duff will make a selection of trees of various sizes and grown under varying conditions. These will be marked and the conditions of growth noted, so that when the tests are made not only the age and condition of the tree will be known, but also to what part of the tree the pieces tested belonged. It is hoped that tests made under these conditions will reveal such distinguishing characteristics of growth as will enable the architect, engineer, and builder to pronounce upon the qualities of timber which they are called upon to use. Whether or not this most valuable result will be achieved cannot be known until the tests shall have taken place.

Mr. Duff conducted a series of tests at the School of Science last winter to determine the strength of small

pieces of white pine. The object of using small pieces was to enable users of timber for constructional purposes to make their own tests without the use of testing appliances. One important result of these tests was the discovery that invariably the character of the fracture of a good piece of timber differed entirely from that of a poor piece, and that each quality always showed the same kind of fracture. The timber of good quality showed a "bushy" fracture, while the stick of poor quality broke straight across and showed a single large diagonal split. The pieces tested were about 4 feet in length and $2\frac{1}{2}$ " $\times$ $1\frac{1}{2}$ " in diameter. It is proposed to begin next winter the more important tests above referred to. They will be carried on in connection with the fourth year work of the students of the School of Practical Science, and the results will be looked for with much interest by architects, engineers, builders, and others interested in works of construction. A room is now being fitted up in the school in which to note the effects of dead loads upon various materials. These materials will be loaded to a point near to the breaking strain, and will then be allowed to stand thus loaded for a length of time in order that the effect be noted.

ILLUSTRATIONS.

SOME HOUSES IN TORONTO.—EDEN SMITH, ARCHITECT.
NURSE'S HOME, GENERAL HOSPITAL, MONTREAL.—ANDREW T. TAYLOR, F.R.I.B.A., ARCHITECT.
NATIONAL TRUST COMPANY'S BUILDING, MAIN STREET, WINNIPEG, MAN.—GEO. W. GOUNLOCK, ARCHITECT.

RATING OF RADIATORS AND HEATING BOILERS.

Mr. D. M. Nesbitt, President of the Institution of Heating and Ventilating Engineers, in an address delivered to the members of that Society recently, said: "I think that I cannot do better than mention to you some of what I believe are apparent defects, as I see them, in our profession. Let us take radiators. I am sure many members here will endorse my remarks when I state that a radiator, which is a first-class article for steam, is often a very bad one for hot water, and vice versa. I know a case in the north of England where an architect, a friend of mine, who has just erected a public building in which the contracting, heating, and ventilating engineer allowed 10 square feet of heating surface per 1,000 cubic feet of space, but he could not get the building warmed satisfactorily. I am satisfied the radiator in this job is unsuitable for hot water circulation.

Again, I think we should insist upon manufacturers guaranteeing a certain amount of actual heating area in each section or loop, not merely mentioning a rating which is practically of no value to an engineer who has to give a guarantee to his client to perform certain work. This has been a vexed question for many years in the United States of America—the home of the "Radiator" trade—and many of the heating and ventilating engineers in that country have complained to me bitterly of the apparently false ratings of radiators in certain makers' catalogues. I think also that all radiators should be tested by an independent authority—indeed, by a specialist—under fixed conditions; that his decision should be final, and the heating trade should reject any radiators that do not bear such test or "Hall" mark. It is no more to ask for this test of radiators than it is to ask for a test with a girder, column, or high pressure boiler.

Similar remarks might be made about the various kinds of heating boilers that are placed before the engineering trades. Many of the boilers catalogued will not perform their duty up to anything like the figures which are stated."

It is proposed to reorganize with a competent staff of teachers, the art Students' League of Hamilton.

Mr. Duncan Ross, the well-known railway contractor, died a fortnight ago in the Western Hospital at Montreal as the result of an attack of pneumonia. The late Mr. Ross was a native of Nova Scotia and was 55 years of age.

WINNIPEG.

Expectations have not been quite realized as to the amount of building operations in progress up to the end of June, although the showing is satisfactory as far as it goes, evidencing the great faith of Eastern Canada and our own citizens in the stability and recuperating powers of this Great North West.

Building Inspector Rogers states in his report to June 25th that he has issued 239 permits representing \$760,000 in value, an official declaration indicating the true state of affairs in the building trades as against the loose newspaper compilations of previous years. Assessment Commissioner Harris will find the data secured on these permits of immense service to him in his department.

By the appointment of Mr. Cambridge as city electrician, and inspector, a degree of safety in wiring has been secured, insuring as it does by thorough inspection a compliance with the city by-laws, and a uniformity of workmanship wholly lacking previous to the formation of this important branch in civic service.

The work of the City Engineer's department has been increasing largely in recent years; miles upon miles of streets have been macadamized, experiments in asphalt pavements made, granolithic sidewalks laid down, and a new waterworks system, with buildings and machinery nearly ready for operation, all executed under the skilled direction of Lt. Col. Ruttan. A special article in this connection is being prepared for a future issue of the CANADIAN ARCHITECT AND BUILDER.

Another old landmark is gone. The old Merchants' Bank building has been torn down by Contractor E. Cass to make way for a handsome structure to be built from the designs of Messrs. Taylor & Gordon, of Montreal, with Frank Peters in local charge.

The superior nature of the work in the two banks now nearing completion on Main street—the Dominion Bank and the Bank of Commerce—is making itself felt in labor circles, as well as upon the purses of owners who propose to build in their vicinity. First-class workmanship means money, and is the best kind of an investment after all, although the initial cost may be greater. The old Merchants' Bank was considered an ornament to the city, not so long ago either, a substantial building at that, but the progress inevitable to a flourishing financial institution demanded its destruction for a costly and more suitable up-to-date construction to take its place.

Darling & Pearson, of Toronto, the architects of the Dominion Bank and the Bank of Commerce, have got good value for the money expended upon the works, the latter presenting an artistically designed classic street elevation, one which will prove satisfactory even beside a building of greater height, so elegant are its proportions. The writer is an ardent Gothicism, but there are situations when admiration can be extended to a rival style. The Toronto architects have not been so happy in the architectural treatment accorded to the Dominion Bank corner, although it is a fine edifice with much detail worked in red terracotta to the street elevations. As this letter is but preliminary to further extended remarks on the more important buildings in the city and province, brief allusions must suffice for the present.

The walls of the Y. M. C. Association building, Geo. Browne, architect, are beginning to loom up on Portage avenue, and passers by are beginning to form some idea as to its size. Phil. Burnett is contractor for the masonry work, etc., John A. Girvin for the carpenter work and some other trades. Local brick and Indiana limestone are the materials selected for front elevations.

Brickmaking in Manitoba is still in its infancy. It will hardly be believed that if architects specify a bevelled plinth, or splay brick, the work has to be done by hand. A beaded or molded brick seems to be an impossibility, and the monotony in color is a great drawback to the artistic inspirations of the intelligent professional man who longs for what he cannot get. It is this desire for warmer tints on the part of owners and architects that has created so large an importation of bricks from the United States, and which has caused, what Ruskin hated intensely, the painting of so many buildings on our principal streets red. Not the Bacchus article, but prosaic every day paint. Eastern brick-makers, say in Ontario, could easily do a big business in this city and province provided they could induce the C. P. R. to lower their freights.

The partial failure of the wheat crop owing to the long continued drought has stopped some projected building enterprises, but the blessed rain has just come in time to relieve the minds of chronic grumblers, and even a total failure could not hinder the progress of Manitoba, however much its rapidity of development might be temporarily checked. That the local mer-

chants and professional people of the province are full of faith is plainly evidenced by the numerous residences now in course of erection, particularly in Winnipeg, where almost every street with sewer and water connection shows more or less tasteful designs from the studios of Walter Chesterton, Hugh McCowan, Geo. Browne, F. Peters, C. H. Wheeler, H. Griffiths, S. Russell, Jas. Chisholm, J. Greenfield, and others, together with Mr. Shillinglaw, of Brandon, and Mr. Silverthorne, of Portage la Prairie.

Owners and architects here as elsewhere owe much to the honesty of the builders who undertake the responsibilities of construction; a straightforward contractor, one to be depended on, is a jewel of price. There are many such in this city, and the writer knows of a couple of dozen or so in the province whose word is their bond, and who can be trusted to do the right thing, even at a financial loss to themselves. These gentlemen are entitled to as much consideration as the professional man, especially in the CANADIAN ARCHITECT AND BUILDER, whose aim it is to bind closer the friendly ties between the professional and non-professional elements in the building trades. Reference will be made to our leading builders in future issues, and those departments essential to an up to date edifice—plumbing, painting, heating, etc.—with the principal men engaged in the sections just named.

The ruins of the Manitoba Hotel cast a dismal shadow over the trade prospects of South Main street which even the enlargement of that fine block known as the Hudson Bay stores cannot dispel. It is a dark cloud hanging around that end of the city with distasteful consequences to many of the stores in the immediate neighborhood.

North Main street, with its shacks and shanties, waxed jubilant over the announced commencement of the new C. P. R. hotel and station at the beginning of the season. The tenants on the purchased property had notice to clear out by May 1st, but they still hold their several forts or shacks, and the hotel scheme hangs fire. Considerable property changed hands, many sets of plans were drawn for new buildings, improvements were sketched out and were to have been promptly acted upon, when it gradually dawned upon the minds of the parties interested that nothing was apparently to be done this season, although it is not yet too late for the railway people to put in foundations.

By the time this correspondence gets into print His Excellency the Governor-General of Canada will have arrived in Winnipeg, the directors of the Winnipeg Industrial Exhibition having invited Her Majesty's representative to open the proceedings. He has graciously consented, and a very large influx of visitors is expected on Monday, July 23rd, to the end of the week. The directors have erected what is said to be the most commodious grand stand in Canada—size 150 feet long by 116 feet wide, with three 50-foot spans, and roof supported by Howe trusses, thus doing away with a multiplication of posts. Mr. Wheeler, architect; Mr. S. B. Ritchie, builder.

The science building in connection with the University of Manitoba is rising rapidly. Mr. Browne, architect; Mr. E. Cass, the masonry, and Mr. Mitchell, the carpentry and some other trades.

Labor troubles, thanks to the good sense of both sides, have been few this year; in any event arbitration can always be resorted to without an undue prolongation of strife.

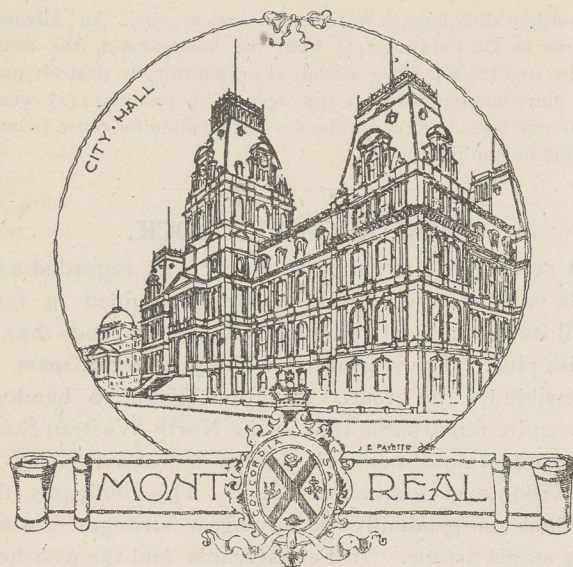
Who will get the contract for the St. Andrew Rapids improvement for which tenders are being asked? Kelly Bros., of this city, know the ground well, and will doubtless stand a good chance to secure the plum. There is a revote of \$125,000 for the work on account in the supplementary estimates at Ottawa.

Mr. Walter Chesterton is recounting a few reminiscences of his recent visit to London, England, and the great changes that have taken place in city and suburban architecture. He is particular in his admiration of the use of genuine stone and brick as against the stucco fronts which made so many residential streets hideously monotonous.

Mr. W. Brydon is one of the busiest men in the city. In addition to his own large building business he is official appraiser for the fire companies, and still finds time to act as chairman of the Works Committee of the Exhibition Board. Not by any means an ornamental position either.

CHAS. H. WHEELER.

The Art Museum of Toronto has been incorporated to promote the cultivation of fine and applied art. The following gentlemen compose the provisional Council: Messrs. G. W. Allan, James Bain, jr., G. A. Cox, F. Darling, R. Y. Ellis, J. W. Flavell, E. W. Gurney, S. H. Janes, E. F. B. Johnston, James Loudon, Charles D. Massey, Jas. Mavor, J. P. Murray, Frederic Nicholls, E. B. Osler, G. A. Reid, B. E. Walker and D. R. Wilkie.



Branch Office of the CANADIAN ARCHITECT AND BUILDER,
Imperial Building.

JULY 10th, 1900.

In walking through the city one is impressed with the fact that there are probably fewer buildings under construction at the present time than is usually the case at this time of the year. More especially is this to be noted in the case of residences as the high price of materials and a stiffening of the money market as regards loans has prevented the speculative builder from running riot. This condition of things will doubtless soon strike its own balance either in the lowering of prices for building materials or in the enhanced value of the present structures. The iron market has already weakened though the prices of all kinds of lumber appear to hold their own.

The railway companies with their increased earnings, are evidently able to look above and beyond such trivial matters as prices for they are certainly taking honors in the building line at the present time. Both the Grand Trunk and the Canadian Pacific are very busy, the former proceeding with their large office building facing on McGill street and taking in the block between William and St. Paul streets, giving a splendid light on all four sides. The basement and ground floor are of Stanstead granite and are fine large blocks of good quality. The upper stories are of Indiana buff limestone and the whole structure will be fireproofed with porous terra cotta. This building when complete will enhance the general appearance of McGill street and when the old St. Ann's market is removed, property on this street should once more tend upwards. The Canadian Pacific are if anything busier than the Grand Trunk, as they have a large extension being erected to their Windsor street building as a large eight story office building on the corner of St. Francois Xavier and Hospital streets for the telegraph branch of the company's business.

The extension to their station is of similar design and material as the main building, and is to be fireproofed by Roebing Company's system of concrete. Mr. Edward Maxwell is the architect. The telegraph building is to be constructed of olive New Brunswick stone for the first two stories, the remainder being built of Scotch firebrick, similar to that used at the Chateau Frontenac at Quebec and the Place Viger Station in Montreal. The building, it is understood, is to be fireproofed throughout with the Expanded Metal Company's system of fireproofing. The building measures about 100 feet on St. Nicholas street and 45 feet on St. Francois Xavier street, with an entrance for the offices on Hospital street, while the entrance for the telegraph business will be on St. Francois Xavier street. The architects in charge of the work are Messrs. Hutchison & Wood.

On St. James street there is very little to report this year. The La Presse building is now complete; the "Star" building is nearly so and the tenants are in the Merchants bank building. This building has now grown from a 4 story building to one of double that capacity. The Molsons bank has extended its banking room to its line at the rear, but otherwise there is no new work on this street that has been started this spring. St. Catherine street does not seem to be much busier. Messrs. Henry Morgan & Company have erected a handsome extension to their large departmental store, and have already added a branch for paper hanging and decorating—the first wedge into the contracting business. Near the corner of Peel street the two stores east of Messrs. Tooke's block has been recently purchased by Mr.

Inglis at \$15 per foot, the highest price so far realized on this street. It is understood that Mr. Inglis intends erecting two handsome stores on this site next spring. There are at present 5 stores being erected on the north side of this street between Mountain and Drummond streets, for Mr. Pacaud under the supervision of Mr. Eric Mann.

In buildings for educational purposes McGill College heads the list, as she is adding to her medical building and rearranging this portion of the college, when it is expected McGill will have an opportunity to boast in having one of the best equipped medical colleges in America. Besides this work a large additional stack room is being built on the south side of the present library building. Mr. Andrew T. Taylor, of the firm of Taylor & Gordon, is the architect of both these structures. The Catholic School Commissioners have recently approved of the plans of Messrs. Perrault & Lesage for the St. Eusebe school, on condition that the entire cost, including site, construction and all contingent expenses, should not exceed \$35,000.

As regards churches the Franciscans are proceeding with the erection of their church on Dorchester street, under the superintendence of Messrs. Resther & Sons, while the Roman Catholic residents of Westmount have decided that a church is needed in that locality, and intend to erect a church and presbytery at a cost of about \$50,000. Melville Presbyterian church in Westmount has divided and the portion of the congregation who are to withdraw have decided to build a church capable of seating about 600 on the east side of Westmount park, at a probable cost of \$12,000. Westminster Presbyterian church on Atwater avenue are completing their structure, of which a portion had been built for some years. There is also a Baptist church being erected in Point St. Charles from designs by Mr. A. T. Cooke. The addition in the form of a new chancel, etc., to St. James the Apostle church is now complete. The proportions of the new chancel are very pleasing, though the moulding of the chancel arches did not appear quite so happy. The large Roman Catholic church of St. Jean Baptiste is now nearing completion and the dome is standing in all the naked beauty of its iron frame.

The committee appointed by the City Council to look into the desirability of annexing some of the outlying municipalities has been holding several meetings. Replies have been received from some in regard to the amount of their debt and valuation roll. It is understood that Westmount has politely declined the invitation, but that both St. Henry and Outremont are in favor of being annexed. It will no doubt be of interest under this heading to give the sales of real estate in each of the city wards and then a few of the outlying municipalities for the past 5 months. They were as follows:

	Jan.	Feb.	March.	April.	May.
St. Antoine.....	\$217,944	\$170,425	\$384,903	\$466,593	\$172,266
St. Ann's.....	32,712	2,005	7,951	16,843	49,750
St. James.....	126,915	53,038	66,078	95,240	154,281
St. Louis.....	74,642	21,200	73,207	40,547	34,746
St. Lawrence.....	55,551	133,815	40,511	40,566	75,667
St. Marys.....	28,500	89,511	55,714	60,961	41,728
St. Jean Baptiste..	38,711	48,850	66,515	63,387	54,190
St. Denis.....	35,039	26,091	38,442	54,839	9,769
St. Gabriel.....	31,633	13,550	7,852	14,273	16,488
Hochelaga.....	7,813	11,999	2,550	25,628	8,358
West.....		7,600		275	45,300
Centre.....		50,000		40,000	
East.....					13,094

OUTLYING MUNICIPALITIES.

Westmount.....	\$109,414	\$122,158	\$167,759	\$91,296	\$66,112
St. Henry.....	20,212	33,309	55,271	12,226	19,930
Mile End.....	67,128	48,930	44,414	35,878	62,947
Maissoneuve.....	49,100	25,590	1,350	40,936	40,011
St. Cunegonde.....	15,350	2,187	11,970	14,102	13,009

There were some very successful meetings held in this city in the end of June, in connection with the annual convention of the Association of Master Plumbers. Delegates were present from nearly all the principal cities from Halifax to Vancouver, and all seemed to take a lively interest in the working of the association. The officers elected for the ensuing year were as follows: President, W. H. Meredith, Toronto; Vice-President, J. McKinley, Ottawa; Secretary, W. Mansell, Toronto; Treasurer, J. Lamarche, Montreal. The delegates expressed their appreciation of the kind reception they received from their fellow workers in this city as well as from the civic authorities. The meeting of the association next year will take place at Toronto.

In reference to the street railway continuing their line from Cote de Niegues road, through the property owned by the Seminary and the Trafalgar Institute, as far as St. George's Club House on the upper level of Westmount, the committee recently reported that the town of Westmount would be willing to concede a bonus

to the Montreal Street Railway Company on the following conditions, and that the whole is ratified by by-law :

"In consideration of the street railway continuing and extending their lines from the present terminus on Cote de Niegues Road, across the Seminary and Trafalgar Institute property, along Westmount Rd., Avenue and Boulevard, as far west as St. George's Club House. The town of Westmount will pay a bonus of one thousand dollars per annum for ten years, commencing from the day the cars run on said extension to St. George's Club House, subject to the following : 1. That the said extension to St. George's Club House be further extended and continued round the mountain and then eastward to Westmount Road, so as to form a circuit of the mountain. 2. To construct a loop line to Sherbrooke St. from the Boulevard, via Argyle avenue or some other street parallel west of Argyle Ave., within the above mentioned three years. 3. To carry passengers to or from the city to any point on said above mentioned extension and loop line at single fare. 4. The cars on said extension or loop line to run at intervals of not more than ten minutes each way.

Mr. Justice Davidson recently gave judgment in a case between the Asbestos & Asbestic Co. and the William Sclater Co., Ltd., to enjoin them from using the word "Asbestic" or "Asbestic Wall Plaster," on the ground that it was an infringement of their trade mark. The Court held that the word Asbestic was of general use and that words used to describe an article were common property. The Court of the Queen's Bench (in appeal) has unanimously decided that a landlord who rents his houses to women of ill-repute is guilty in the same degree as the keeper herself and may be condemned to the same penalty as the principal. This judgment was given in a case which was initiated by the Recorder's Court.

Sir William McDonald, with his usual generosity, has offered to erect and endow a crematory for Montreal, and in order to have the best and latest ideas embodied in his scheme, he, together with Mr. Andrew T. Taylor, architect, visited Boston, where the most improved plant is to be seen. It is understood that plans are now under way and that this city will soon be numbered among those that can give an option on the manner in which the last rites to the dead are to be carried out. Sanitary and common sense reasons seem to point to cremation as the better method, though it will doubtless be many years before it will be used even by a majority of persons, and in this case it will probably be longer on account of the sentiment of an old custom lingering still more over the old ceremony.

During the months of May and June summer classes in drawing, modelling and painting, open to men and women students, were held in the rooms of the Architectural Department of McGill University under the direction of Mr. Henry F. Armstrong. Instruction was given daily, except Saturday, between the hours of 9 a.m. and 5 p.m., in addition to excursions for outdoor sketching. The courses of study embraced the following :

FREEHAND DRAWING IN LIGHT AND SHADE IN LEAD PENCIL AND CHARCOAL.—An Elementary Course, including, (1) the drawing of common objects, casts of ornament, architectural details, and studies embodying the principles of perspective—as preparatory to outdoor sketching, etc.; (2) the drawing of plant life; (3) outdoor sketching of landscape subjects in pencil. An Advanced Course, including, (1) the drawing of animals from casts in relief and in the round; (2) the drawing of the human figure from casts of antique and other sculpture; (3) studies in drapery; (4) drawing from the living human figure; (5) weekly exercises in figure composition for those drawing from the living model.

PEN AND INK RENDERING AND BLACK AND WHITE WORK.

MODELLING.—An Elementary Course, including, (1) the modelling, from casts, of ornament in low relief and in high relief; (2) casting in plaster of paris. An Advanced Course, including, (1) the modelling of animals from casts in relief and in the round; (2) the modelling of drapery; (3) the modelling of the human head and the human figure in low relief and in high relief from casts of antique and other sculpture; (4) the modelling of the human head, torso, and complete figure in the round, from casts of antique and other sculpture; (5) the modelling of the human head and figure from life; (6) weekly exercises in sculpture composition for those studying the full figure from life.

PAINTING IN OILS AND WATER COLOR.—An Elementary Course, including, (1) studies in still life, or still objects, material, fruits, etc., in groups arranged as compositions in color and light and shade. (Mixture of colors, handling, technique, etc., taught in this section); (2) studies from plant life in bloom; (3) indoor studies in landscape art as preliminary to outdoor work;

(4) outdoor sketching in water color and in oils. An Advanced Course in Oil Painting, (1) from the human head, the draped figure, and the full living model, as preparatory to portrait painting, pictorial compositions, and decorative painting; (2) weekly home exercises in figure and color composition for those painting the full human figure.

VALUE OF HEMLOCK.

A FEW years ago hemlock lumber was regarded as of little value, but recently it has steadily gained in favor until its commercial value has almost reached that of white pine. The scarcity of white pine is in part responsible for the greater attention given to hemlock. It is quite remarkable that in the North-Western States the production of hemlock lumber increased during the year 1899 over 200,000,000 feet. This indicates that hemlock is gradually occupying a stronger position as a staple article. In Pennsylvania and the east hemlock has for some time been used for the cheaper classes of buildings, and now that it has come into more general use in the west, the question has arisen as to its value in relation to white pine. The opinion seems to be gaining ground among the hemlock manufacturers that there is no reason why it should not command a price equally as high as white pine; in fact, the North-Western Manufacturers' Association have established a list only \$1.50 below the pine quotations. This, it might be said, is the highest relative price yet obtained for hemlock piece stuff.

What has been said regarding the hemlock of the United States is equally true of the Canadian product. There are, in Canada, two varieties of hemlock. The timber commonly known as hemlock is found more or less abundantly in the provinces of Ontario, Quebec, New Brunswick and Nova Scotia, while the western hemlock is common to British Columbia only. The quality of western hemlock is superior to the eastern article. It is likewise shown by tests that the hemlock of eastern Canada is of better quality than that of the United States. The specific gravity, elasticity, transverse strength, and resistance to indentation are higher in the Canadian article, while only in resistance to longitudinal compression is the United States article shown to be superior. It is also worthy of note that tests of hemlock show that material to be superior in some qualities to white pine, but, of course, it is generally inferior to that timber, and is not capable of taking as good finish.

There is, we believe, a promising future for the hemlock timber of Canada, and although it may never become as generally used as the white pine, its value will no doubt advance as the merits of the timber become more generally known.

The rules for heating of buildings are many and various but the following are given as having been found reliable in practice : Allow one-fourth square foot of radiating surface for each $\frac{2}{3}$ of the cubic contents for first floor rooms and halls; the same amount of radiating surface for each $\frac{1}{3}$ of cubic contents of room for second and upper floor rooms, and one-fourth square foot of radiating surface for each square foot of glass surface plus that of exposed wall. Wolff gives the following allowance for special conditions : Increase ten per cent. for northerly exposures subject to wind, and ten per cent. when the building is heated during the day time only and when the building is not exposed. Increase 30 per cent. when the building is done in the day time only and when the building is much exposed. Increase 50 per cent. when the building is heated during winter months intermittently at long intervals. The above factors make a considerable modification and what factor to use in any given case is a matter of judgment based on experience.

BY THE WAY.

"I HAVE arrived at the conclusion, based upon a careful consideration of the subject, that the citizens of Toronto get value at the rate of only about 40 cents on the dollar for the money expended on so-called public improvements" remarked a prominent business man of Toronto to me recently. "For example" said he, "look at that piece of land on the water front, formerly occupied by the C.P.R. depot, and which cost the city a quarter of a million dollars. It was purchased for a public square, with the idea that it should be made an attractive spot which would enhance the appearance of the entrance to the city from the lake and afford a delightful breathing place to the citizens during the heat of summer. Instead of fulfilling these commendable purposes, for want of proper attention it has become a receptacle for old tin cans and such like refuse. The expenditure of half a million dollars on the so-called 'Don improvement scheme,' was entirely thrown away. The St. Lawrence market bungle affords another object lesson in the same direction, and the list might be indefinitely extended."

x x x

WE have recently been asked says a writer in the British Clayworker what terra alba is. It is one of those substances the history of the production of which is clear enough, but its history after that is particularly uncertain. It seems to be known only in England to a chosen few who take particular care to keep what they know about it to themselves. And they have every reason to do so, in most instances. Terra alba is ground gypsum. It is in at least two qualities depending upon the purpose for which it is required. The chosen few have learned a few wrinkles about it from Nova Scotia. It is some extent employed in making up cheap white pigments, where the purchaser in some instances imagines he has white lead. Now and then it may usurp the place which ought to be occupied by barite in paint manufacture. It is of very clinging nature and wherever the manufacturer has a mind to cause a substance to be rather more weighty than it ought to be he often looks toward terra alba. In short, it is commonly used as an adulterant for many purposes—far too numerous to specify. The substance is not injurious to health, unless the taker deliberately sets himself to feast on it. It cannot be classified as a plaster, for it is not calcined, and the prime qualification to be possessed by the gypsum from which it is made, is that the latter shall be as pure as can be. Of course, so far as its use in cheap paints is concerned, that is legitimate enough; but of some of its other uses—well, we would rather not express an opinion. Somerset House might, however, do so, if it felt that way inclined.

x x x

THE Executive of the Canadian Manufacturers' Association have been considering the question of the advisability of holding a Dominion Exhibition in Toronto next year. The opinion of the members of the Association has been asked as to whether the Association should go beyond this and make an exhibit at the Pan-American exhibition to be held in Buffalo. The consensus of opinion seems to be that, if the project for a Dominion Exhibition is gone on with, no attempt should be made to exhibit at Buffalo. This opinion seems well founded. If a Dominion exhibition is undertaken and carried out on a creditable scale, it will sufficiently tax the energies of the Association. It must also be borne in mind that

the possibility of finding a market in the United States for Canadian manufactures is extremely small, seeing that the United have now an over-production in almost all lines of manufacture, and are looking for outlets in foreign markets for their surplus goods. I have felt for several years past that the holding of an Exhibition in Toronto, on such a scale as to attract visitors from all parts of the Dominion should be productive of much good, and if the attempt is to be made it might as well be next year as any other time. The Exhibition at Buffalo would not be likely to interfere with its success, but on the contrary might add to it, as some of the visitors to the larger exhibition might be disposed to visit Toronto also. Speaking generally, it would seem as though the Exhibition idea is likely to be carried to an extent which will eventually deprive it of any novelty or usefulness. I observe that on the heels of the Buffalo Exhibition is to come another one at St. Louis, preparations for which are already in progress. There is also to be one held next year in Glasgow. If Canada is to have an Exhibition on a national scale, it would be as well to launch the enterprise at once, so that we may not come in at the tail of the procession.

THE CANADIAN EXHIBIT AT THE IMPERIAL INSTITUTE.

THE resources of Canada, and particularly of the province of Ontario, are by no means properly or creditably represented by the exhibit at the Imperial Institute in London. The visitor would be much more favorably impressed if the exhibits of the various provinces were placed side by side, instead of on different floors. The present arrangement does not convey the idea that Canada is one Dominion, but rather that it consists of a number of separate provinces having little or no connection with each other. The exhibit should be arranged in compact form like that of Australia. As to the character of the exhibit, and more particularly that of the province of Ontario, the richest and most important of the provinces, there is good ground for complaint. One would suppose from the numerous views of Niagara Falls placed about the walls, that this great natural phenomenon was the one distinguishing characteristic of the province of Ontario, while the specimens of Indian work are well calculated to confirm the idea, already too prevalent in the minds of some of the people of Great Britain, that Canada is a wild and uncivilized country. Ontario is known on this side of the Atlantic as a fruit-growing province, and the quality of its production in this line is not excelled by that of any other country. In view of this fact, it is extremely humiliating to a Canadian to observe that the jars containing samples of Canadian fruit shown in this exhibit have apparently not been refilled during the last decade. What was once fruit might now, judging from appearance, be almost any other substance under the sun. There is also displayed a view of the Toronto Industrial Exhibition of date the year 1885, which, of course, conveys a totally inadequate idea of the character and extent of the Exhibition of to-day. We would suggest that all relics such as this and the photograph of the ruins of Fort Erie, might well be thrown out of the exhibit, and modern views of our principal cities and industries substituted, so that visitors would be given an approximately fair idea of the kind of country Canada is, the extent of its development, and its advantages as a place of residence and business enterprise. The Canadian Pacific Railway show some excellent views of harvesting in Manitoba. These are well calculated to make a favorable impression upon intending emigrants. There is also an excellent geological map of Ontario containing a large amount of information with regard to the population and resources of the province. There is a fairly good exhibit of building stones and marbles, also of hardwoods. Other features equally valuable might be added, so as to convey to visitors a proper idea of the country and its resources. The entire exhibit should either be rearranged, improved, and brought up-to-date, or be entirely done away with.

VENTILATION AND HEATING OF PUBLIC BUILDINGS.*

By P. H. BRYCE, M. A., M. D.

In my addresses to you in the several past years, I have endeavoured to deal with some practical subject in public health work, which you as engineers and architects may be expected to have to deal with. We have drained the ground upon which we were going to build a house; we have carefully considered the source and means of preserving its drinking water in a wholesome condition, and have also set forth in some detail the several means which modern science has supplied for properly dealing with the excretal matters which, as sewage, require removal from such a human habitation.

To-day I propose to deal with another feature of the sanitation of this house, viz., that of the house-air and means whereby it may serve the requirements of health to its inmates.

It is safe to say that while there has been progress in the work of constructing buildings and in the mechanical appliances for heating them, and even ventilating them, in many individual instances during the past fifteen years, yet there is probably no branch of public health work which has shown so little progress in its systematic development in Ontario as of those methods of heating and ventilation, which even in the most general way, have official sanction and are governed by either legislative or municipal regulations. If one were to seek for an explanation of this it would probably be found: First, in the very nature of the problem. It must be remembered that the moment life in buildings with closed sides began in climates requiring artificial heat, it became artificial. "The wind bloweth where it listeth" are the words of the Teacher, applicable to the free movements of the outer atmosphere only, and all attempts to confine air and heat necessarily cause a departure from nature's methods and convert the problem of supplying the dwellers in houses with fresh air into a question subject to the limitations of a secundam artem. A second reason is that from the very nature of the complex life of any population living in populous centres, there are not in Ontario as yet any regulations fixing in any definite way the size, mode of construction, or number of inmates of houses, except where it is stated under the Factory Act that—

Section 15.—(2) "A factory shall not be so overcrowded while work is being carried on therein as to be injurious to the health of the persons employed therein."

"(3) Every factory shall be ventilated in such a manner as to render harmless, so far as is reasonably practicable, all the gases, vapors, dust or other impurities generated in the course of the manufacturing process or handicraft carried on therein, that may be injurious to health."

As the Act states, however, these necessary and reasonable provisions shall not apply where persons are employed at home, that is to say to a private house, or a room or place which, though used as a dwelling, might by reason of the work carried on there be a factory within the meaning of the Act, and in which the only persons employed are members of the same family dwelling there.

It is further provided in the school regulations that public schoolrooms shall have an air space of not less than 250 feet per pupil, with a superficial area of at least 12 square feet, a uniform temperature of 67° F., and provision for a change of air three times every hour.

And a third reason is the lack of well-defined methods of ventilating public buildings, readily applicable to different buildings, arranged so as to secure at a moderate expense an adequate supply of fresh air in such a manner as to be free from draughts.

It will thus be seen that the problem of maintaining house air in a condition of purity necessary to make it in some degree comparable to that of the outside air is in practice a difficult one, judging from results; but nevertheless, when it is remembered that an adult man requires 3,000 cubic feet of fresh air per hour, introduced into his living room in order that such air may be maintained at a point where the carbonic acid produced by combustion in the lungs shall not exceed six parts in 10,000 of air, it is apparent that the evils due to lack of ventilation in private dwellings, public buildings and factories, are one of the most serious sanitary questions existing in our communities. The adoption of some artificial or mechanical means for the purpose of introducing fresh air into dwellings is commonly termed "ventilation," and depends upon some method whereby the air of a room may be removed and replaced by outside air, which, owing to its free movements, always maintains practically the same constitution. This is undersood when it is remembered that air moving at the rate of five miles an hour, or that of the gentlest breeze, will renew the air over a space of a foot square 26,400 times. In warm weather ventilation is easily possible by doors and windows,

but in cold weather air must be introduced into rooms through ducts, having been previously warmed by a furnace.

From the standpoint of the public, there is no doubt that apart from a lack of knowledge of the directly injurious effects upon health of residence in badly ventilated houses, and of the existence of practical means of remedying the evil, the prime difficulty is that the individual recognizes by the eye no difference between the indoor and the outdoor air. He can recognize closeness on coming into a foul atmosphere from outer fresh air, but this closeness is looked upon as inevitable, and the deadened sense of smell soon fails to recognize the foul odors. Moreover, the methods of heating and constructing houses vary so greatly that badly distributed warmth in houses makes people more anxious to confine the heat produced than to introduce fresh air.

Amid the questions of economy to the householder, of the architects who are specially sought out because of their ability to give a fashionable outside to houses, of competition amongst the innumerable manufacturers of furnaces, boilers, grates and stoves, all of which are of course modelled upon the latest scientific principles, it may be well to recall some of the laws underlying what seems so simple, and yet proves to be one of the most difficult practical problems which sanitarians, architects, and engineers are called upon to deal with.

To maintain the human body in a state of health, it must not only be supplied with an amount of food requisite for supplying it with energy for work, but it must also consume an amount equal to the task of maintaining the body at a temperature of 98.4° F. As bodies lose their heat both by radiation and conduction, it is plain that non-conducting clothing plays an important part in preventing an undue loss of body heat; but common experience tells us that for persons employed at sedentary occupations in-doors, an air temperature of 60° to 70° F., is necessary to comfort and health. Further experience tells us that the air of the room must not be in too rapid movement, probably not more than a half-foot per second, and must further be, as nearly as possible, as warm near the floor as 6 feet above it. With the atmosphere in temperate climates ranging in winter from between 30° F. and—20° F., it is plain that the amount of heat required to keep the air of a house warm, will depend (a) upon the construction of the dwelling, (b) upon the number of renewals of air per hour, and (c) upon the character of the heating apparatus employed. As regards the construction of a house, it is necessary that the walls be made of materials which are poor conductors of heat, that they may be so built that moisture will not readily get into the interstices of the materials, as with soft brick, unpainted boards, and damp foundations; and that they will be so well built of close materials that air currents will not blow through them. How essential that building materials be poor conductors may be learnt from the notably different conductivities of different substances for heat. Thus, a wall of wood of equal thickness would be three times better as a non-conductor, than one of brick. It is of equal importance to remember that air confined in a close space is ten times as good a non-conductor as wood, hence the important part played by double windows, glass being ten times better as a non-conductor than wood.

As regards the required changes in the air of the room, it is plain that as this will depend on its size and the number of its inmates, the amount of air to be heated will be simply that required to supply the ideal 3,000 cubic feet per hour to each adult inmate; while the heating apparatus to be chosen will be that which most readily transfers its heat with the smallest loss to the air supplied to the dwelling. While it may be said that, in theoretically discussing ventilation, we need not regard by what method the air to be supplied to a room is heated, yet in practice, the question is a most important part of any system. When carbon or its compounds, whether as coal gas or wood is consumed, it produces heat by the union of carbon with oxygen, while hydrogen at the higher temperatures if present, unites with oxygen to form water vapor. In combustion every pound of carbon forms 3.7 lbs. of carbonic acid, and emits heat enough to raise the temperature of 87 lbs. of water from 62° to 212° F. and every pound of hydrogen produces 9 lbs. of water, and emits enough heat to raise 417 lbs. of water from 62° to 212° F. For the purpose of estimating the value of any fuel, it is most convenient to estimate the number of pounds of water which can be raised by any given weight of fuel; though 1° F. or from 32° to 33° F. which is termed a heat or thermal unit, and which is roughly applicable for every degree from 32° to 212° F. Experiment has shown that 1 lb. of carbon produces 13,000 units of heat and 1 lb. of hydrogen produces 62,500 units. What then is apparent is that economy in heating means that the largest possible number of units of this heat, in-

* Paper read before the Engineering Society of the School of Practical Science, Toronto, and reprinted by permission from the Transactions.

stead of being allowed to escape by the chimney, or other way, be transmitted directly or indirectly to the air of the rooms occupied; the air being in such a condition of purity and freedom from movements, and having such evenness of distribution, that a sense of comfort may be given to all the inmates.

The modes by which heat is transmitted to the air of a room, viz., by conduction, convection and radiation, all play their part, each being given a greater or less importance according as grates, stoves, furnaces, hot water or steam pipes be the method of heating adopted.

The following results, obtained by Profs. Carnelly and Haldane, of Dundee, Scotland, have much interest in this connection; but they are necessarily to be accepted not so much as indicating the value of any particular system as the mode of application of any of the systems accidentally adopted in those particular schools at that time.

Of 323 schools reported upon 150 were personally visited by Carnelly. The great differences were found in the amount of fuel used per pupil. One large school, with hot air furnace, used but 34 lbs. of coal per head in a season, while another used 417 lbs. One with an open fire used but 23 lbs., while another used 239 lbs. In a school for 1,000 scholars the cost in England averaged for installing the system £200 for grates and £500 for low pressure steam. The installation of a mechanical fan ventilating plant with heating cost in a building properly designed for it £850, and put in an old building not specially designed cost £1,000. The results of experiments showed that mechanical ventilation as by fans was much the most effective in maintaining the requisite purity and temperature of the air; was more independent of winds and changing weather; reduced draughts to a minimum, but has a greater first cost and somewhat greater cost for maintenance; but in a town with several schools one janitor could supervise the apparatus in all.

A more recent and perhaps more representative series of methods of heating and ventilation are those found in the reports prepared under the supervision of the Chief of the District Police of Massachusetts, 1896, who has special charge of the work of boiler inspection, fire-escapes and the heating and ventilating of public buildings, factories and workshops of the State. The several reports of this Bureau are of extreme interest, illustrating year by year an advance in the scientific supervision of public buildings. The report for 1896, referring to the ventilation of schools, says, "The practicability of ventilating schools admits of no doubt. It is a matter of exact knowledge as any problem in engineering or mathematics. It can be done by the aid of power, and may be accomplished by heated shafts or by fans; all dependence on natural ventilation should be abandoned. The system of mechanical ventilation can be relied upon with certainty. By mechanical means a steady inflow of pure air under all conditions and atmospheric changes can be secured. The extra expense for the power to move air should be recognized and met without question."

"When so many are enquiring how best to secure good ventilation in schools and other public buildings, the correct methods gained by years of experience should be made known. In this matter of ventilation there are comparatively few who have made it a speciality and have felt it necessary to perfect their knowledge. The time has been reached when the importance of ventilation is generally appreciated, and there seems to be a willingness to do something for the health and comfort of the pupils in our public schools, and it would be a misfortune not to achieve some real progress."

"Good ventilation consists in the proper arrangement and distribution of the ducts of the incoming and the outgoing of the air, and their relation and correspondence with each other, so that the perfect removal of the foul air and the thorough diffusion of the fresh air will be secured. How to supply the occupants of schoolrooms or crowded apartments with the proper quantity and quality of air has not always received the attention its merits demand. Something, however, during the past few years has been done towards an intelligent solution of the problem. To know how much air is needed for a given number of pupils in a schoolroom and to supply it by exact mechanical measurement is now no secret."

"In former reports I have explained some of the methods advocated and in operation in school buildings in the State. One of the methods or systems concerns itself only with supplying air, leaving it to make its way through ducts provided for that purpose. This is done by means of fans or blowers forcing the air into the room. It is the plenum method. Another system or

method advocated is directed to the extraction of the foul air by natural laws, requiring no mechanical means, depending upon the difference between the external and internal temperature, in other words, the tendency of warm air to rise."

"In our experience of the past eight years we have found that the interior temperature of foul-air ducts is practically the same as that of the room. The changes in the temperature are so frequent and the velocity of the wind so various, that, unless additional heat is supplied to the duct, the power of the duct or shaft to draw air from the room will fail in many instances to cause upward motion enough to be measured by the anemometer."

"The ways of adapting the means to the end in furnishing to and removing air from crowded rooms are not questions of experiment. The size of ducts, shafts, etc., their location in the rooms and their distribution are not at the present time severe problems. The questions, "Shall the air be taken in at the floor or at the ceilings?" or "Will an upward or downward movement in the air work to the best advantage?" have been settled upon principles which are available for the practical solution of the problem of ventilation."

"For the effective working of any system of ventilation, it is imperatively required that proper provisions should be made to promote air currents in the right direction, and first in the fresh-air inlet,—the supply of fresh, pure air from pure external sources. The size of this fresh-air inlet is of great importance. In many instances when provided in our public buildings it has been found to be too small. The warming of the incoming fresh air should be considered at this point. Varieties of heating appliances are in use for the purpose of warming the air, two of which I will mention,—the hot air-furnace and the high-pressure or low-pressure steam apparatus."

The difficulties to be overcome by the adoption of any system depend upon the operation of the same principles. Heating by convection is due primarily to the movement of air upwards, heated and by expansion made lighter, and falling again as it is cooled by walls and windows. By these currents of warmed air coming in contact with our bodies, we are prevented from cooling with undue rapidity in the same manner as by conduction the air of the room is cooled by the cold outer walls and windows. It will thus be apparent that with outer currents of air, as winds blowing against a building, the porosity or openness of the walls and the conductivity of the building materials and the doubling of the windows, must all play important parts in the ventilation and heating of dwellings. To minimize the variations of temperature caused by these several influences in different rooms and at different parts of the same room, to maintain the air at a temperature of 60° to 70° F., to secure a humidity of the air approaching 70 per cent. of saturation and to keep the carbonic air in the room at a point below six parts in 10,000, or to secure from thirty to fifty cubic feet of fresh air per minute for each inmate according to age, and to do this economically, is the problem of ventilation.

This must be secured too in such a manner that the velocity at the inlets shall not exceed six feet per second, to be reduced to half a foot per second, when coming in contact with inmates to prevent the sensation of draughts, although experiment has taught us that a velocity of two to three feet per second of air at an ordinary temperature may be endured without a sense of notable discomfort. How much this last point means will be understood, when it is remembered that a room containing 500 cubic feet of air having an inlet of twelve inches square, if supplying 3,000 cubic feet per hour, would have a velocity of .83 feet per second while supplying only enough air for one adult person. It is thus apparent that in order to maintain the requisite purity of house-air without an excessive air movement, a minimum air space fixed by some at 750 cubic feet per capita is necessary, thereby permitting some four changes of air per hour.

Apart from the question of heating and propelling the air into a room, it is equally clear that the size of fresh-air inlets and outlets is of primary importance in the question of the movement of the air. An illustration will make this evident. Assuming that properly warmed air can safely move at a rate of two feet per second without discomfort, and that the fresh-air inlet occupied a quarter of one wall of a square room thirty feet wide, it will have renewed the air in the room within two minutes, or thirty times in an hour. As this air is distributed over a space in the room in columns, four times the volume of that opposite the inlet, the general velocity in the room would be but one-quarter that at the opening, or six inches per second. If further the rate of renewal be lessened, it is apparent that the size of the inlet can still be notably reduced if the distribution of the air at the point of entry

to the room is assisted by the shape of the inlet. Many of these elements which enter into the problem have been estimated, and even given their place in tables; but it is well that the various elements of the problem be recognized. This may be done by a single example.

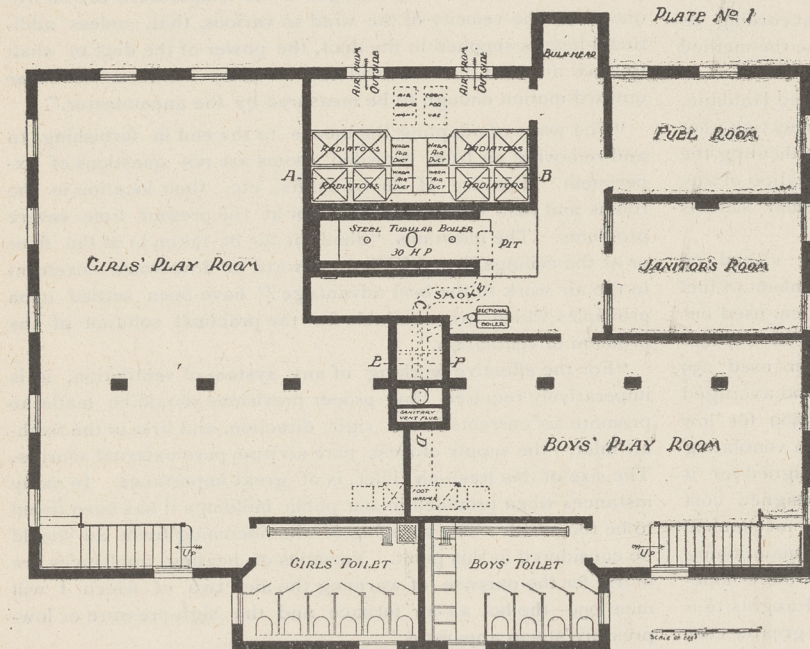
A school house of four rooms, each to have a cubic-air space

on the inner walls, at a point from 6 to 8 feet above the floor, while the outlet should be at the floor in the same wall, and in close proximity to the outlet. This arrangement is based upon the fact that the incoming air is usually warmer than that of the room and therefore tends to ascend, and with the forward movement the impulse along with the higher temperature will distribute the fresh air to the farther side of the room; it being further aided by the lessened pressure caused by the downward movement of the chilled air along the outer wall, and the outward movement of this air along the floor to the outlet.

Summing up these points Mr. R. R. Wade, of Boston, Chief of the Police Inspection Commissioners, says:

"Whatever differences of opinion may exist as to the merits of the various appliances that have been applied for the ventilation of schools or other public buildings, it must be admitted that the system that can furnish and remove under perfect control a sufficient amount of air, with a velocity that can be regulated and so distributed as to supply fresh air and remove foul air from each room with regularity and perfect independence of weather, summer and winter alike, should be the system to be adopted, and in all appliances that is the simplest which most positively and directly effects the purpose in view."

The problem of heating the air equally has in every system proved of much difficulty in practice when a definite amount of fresh air is to be delivered. In estimating the work to be done, it is apparent that an average external temperature must be taken as the basis of



PLAN OF FOUR ROOM SCHOOL
DESIGNED TO SHOW
METHOD OF VENTILATION
See Description

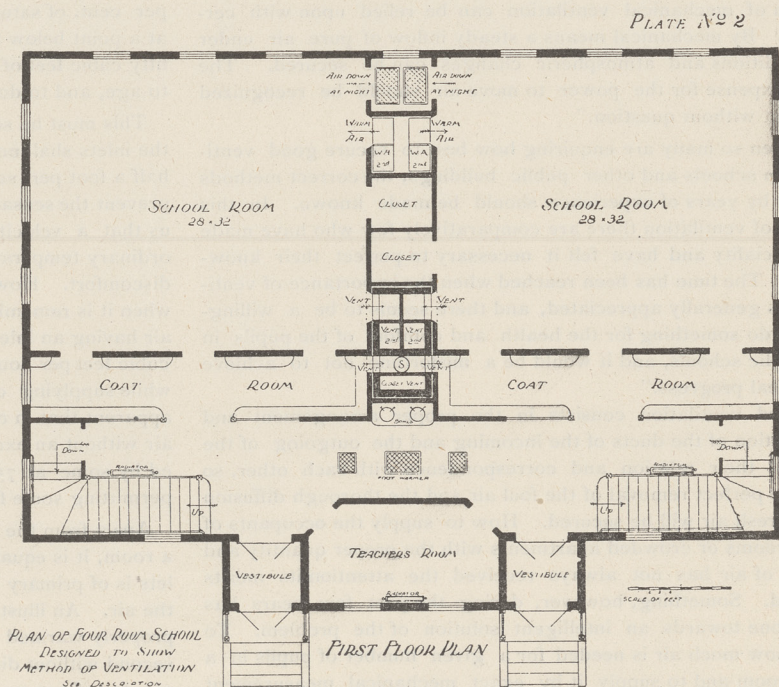
BASMENT PLAN

of 240 cubic feet (or $4 \times 4 \times 15$) per pupil for a school of 200 pupils is to be heated and ventilated.

The construction of the building having been made upon the principles of building already indicated, we have to supply means of ventilation for supplying 2,000 cubic feet of fresh air per pupil per hour, or 100,000 cubic feet per hour must be poured into each room with cubic capacity of 12,000 feet. This means $8\frac{1}{3}$ changes of air per hour, or a renewal of air every 7-15 minutes. An inlet of 2 ft. $\times$ 2 ft. would deliver the requisite volume of air if moving at the rate of 6.94 feet per second. With the ordinary smooth ducts, as when lined with tin, to prevent friction as far as possible, it is estimated that from 20 to 25 per cent. is lost by friction, so that in the present instance the duct delivering air in the amount stated at the rate indicated should be about 2 ft. $\times$ 2.5 ft. in area. It is apparent that the forward movement of this volume of air will depend not only upon a steady motive power, a vis a tergo, by which, as with a fan, a regular pressure is maintained in the duct, but also upon there being a free exit duct to conduct the air from the room, which removal of air can indeed be accelerated by an exhaust fan at the outlet of the duct or by a coil of steam pipes in the exit shaft by which the air is heated and thereby made to ascend. Much experience in ventilating shafts by the officers of the Massachusetts Bureau leads to the conclusion that "as a rule, a reduction of one-fifth the area of the foul air outlets for the size of the fresh air inlets has proved sufficient for inflowing fresh air. I have seen no reason to change this statement, and it will be found that ventilating engineers and architects who have been most successful in obtaining good ventilation have varied but little, if any, from the above rules." It is apparent that with the size of the inlets being determined as being, say 80, the outlet would be represented by 100. Along with the various elements as regards the size of inlets and outlets, it is important to have determined by experiment the most successful points at which inlets and outlets should be placed in any room, in order to promote the even distribution of the air introduced. Both English and American authorities are now agreed that in rooms of the ordinary size, as those in schools, inlets should be arranged

ordinary work, and that for extremes a system of extra coils must be supplied either in the rooms or in the fresh air chambers in the basement. A four-horse power gas engine has been proved sufficient to give to a 4-foot diameter fan enough revolutions to supply 1,000 persons (pupils) with 2,000 cubic feet per head per hour; hence with any system of steam heating, boilers of sufficient power can be economically used, even where electricity is obtainable for supplying power to fan.

In the problem here we may assume that the outer air is to be heated to a temperature as low as 15° F. in the basement cold-air chamber, to be delivered in the room at 70° F., and that for colder weather steam coils be placed in the rooms for subsidiary heating.



PLAN OF FOUR ROOM SCHOOL
DESIGNED TO SHOW
METHOD OF VENTILATION
See Description

FIRST FLOOR PLAN

In practice it may be said that the same number of heat units is required to raise water through any degree of temperature from 32° to 212° F., and proportionately air through any degree from 15° to 70° F., the ratio between air and water being at 212° F., as 1 to 1,000. Now the weight of a cubic foot of dry air at 32° F. and 30 inches of barometric pressure is 566.9 grains, or 100 cubic feet equal 81 lbs. Assuming that a cubic

PLATE No 2

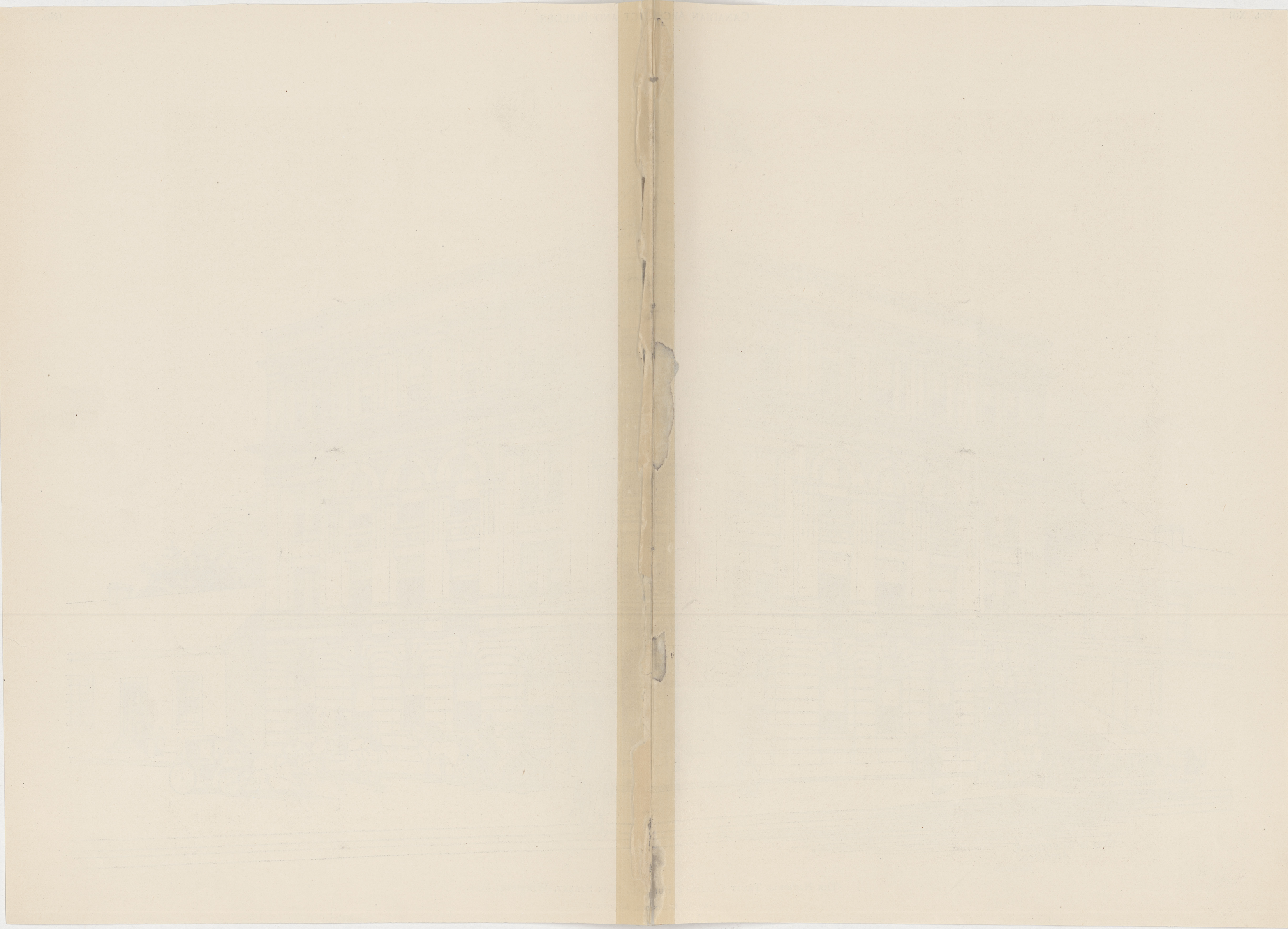


JUBILEE NURSES' HOME, MONTREAL GENERAL HOSPITAL.
ANDREW T. TAYLOR, F.R.I.B.A., ARCHITECT.



THE NATIONAL TRUST COMPANY'S BUILDING, MAIN STREET, WINNIPEG, MAN.

GEO. W. GOUINLOCK, ARCHITECT.



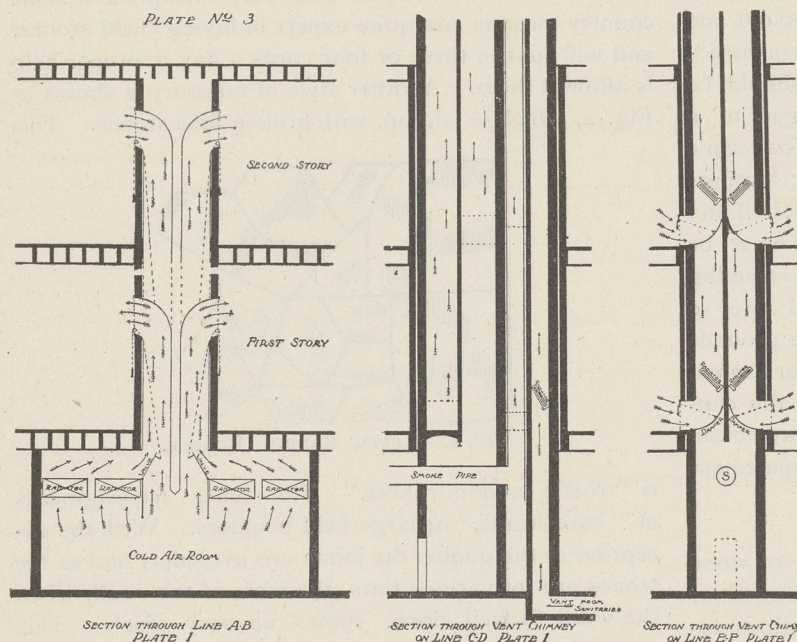
foot of water at 212° F. weighs 60 lbs., it will hold 10,800 units of heat. Hence it would raise 3,272 cubic feet of air through 55° F. It has been estimated that the combustion of 1 lb. of coal will produce 14,000 heat units, and if the combustion in an ordinary furnace amounts in loss to 3,200 units, or more than one-fifth, we find that 1 lb. of coal will raise 1 cubic foot of water from 32° to 212° F., or will heat 3,272 cubic feet of air. Or, roughly, 4 lbs. of coal will be sufficient to heat the 12,000 feet of air required to change the air of a room, 32 ft. $\times$ 25 ft. $\times$ 15 ft., in $7\frac{1}{2}$ minutes. It is apparent that the amount required will be the same, whether the method of heating be by hot water, steam or hot-air furnace, provided the combustion be equally good in all and the loss of heat the same, if the mechanism provided supplies the heat to the fresh air all at the same rate.

Taking warm weather with cold weather throughout the winter season in Ontario, this calculation would mean that, for a school-building of four rooms of the above size and holding 200 pupils, from 25 to 30 tons of coal would supply an adequate amount of heat.

The illustration of principles thus given in some detail enables us in some degree to estimate the various factors entering into the problem of ventilation. Many simple methods are adopted for lessening the evils of over-crowding and air foulness in small buildings, but the scientific problem having had its practical solution in a large measure determined, it now requires some

the velocity of cross-currents of air at the entrance of the shaft for fresh air from the exterior, the variations in barometric pressure and in external air temperature, all demand an intelligent comprehension of such causes and their effects, and of means in the mechanism of ventilation of making compensation for such variations. From the standpoint of legislative enactments to provide for the application of scientific means to secure a standard of ventilation in any public building and for supplying such system of expert officers for inspecting and regulating this work in public buildings in this Province, it would appear evident that at the present time there is no means similar to that for many years in operation in Massachusetts adequate for the work to be done. Local Boards of Health have, under the general provisions for inspection of the Public Health Act, probably enough powers to correct any serious unsanitary condition, but the exact scientific knowledge requiring to be applied to any particular case demands some special scheme to be formulated, so that new buildings in all urban municipalities and all school buildings in rural districts should have their plans approved before construction, and certainly proper provisions for ventilation, while definite powers to compel the adoption of adequate measures in old buildings should be put into systematic operation.

It will be, gentlemen, for you who are trained in the exact sciences which relate to this important matter, to so influence those in the position of municipal officers and trustees of schools to institute such improvements as will attain such desirable results as I have endeavoured to set forth.



specific measures for its systematic application to schools and public buildings. As an illustration of modern systems in practical operation the following may be given. It is from the Massachusetts report for 1896.

The plans are simply to show how the heating and ventilation of a four-roomed school building may be simply arranged:

The basement provides for the boiler-room with a 30 h. p. boiler, a cold-air room, the coal-room, the boys' and girls' play-rooms, the w. c. and lavatories.

The ground floor has its hall-way, and 1st and 2nd schoolrooms, its inlets and outlets for fresh air, and its cloakrooms.

The first floor has the principal's room, and the 3rd and 4th rooms, similarly heated and ventilated.

The third plan shows us in section the ducts and arrangements of cold-air rooms, and valves for regulating the temperature in the rooms, operated either by a chain or thermostat.

The areas of the ducts are given, while the heating provides for steam coils in three series so that 100, 120, 140, square feet of radiating surface for each room, may successively be turned on as the external cold increases. In some the heating and ventilating arrangements provide for part of the steam coils to be in the school-room, and these supply the extra heat in severe weather by direct radiation. The ventilation may similarly, and with advantage, be supplied by a fan. One of 3 feet in diameter not exceeding 600 revolutions per minute, will supply more than the calculated requirements of such a building.

It is apparent that with whatever system we may adopt there are many details in its practical operation which demand intelligent supervision if successful results are to be obtained. The questions of friction and the size of fresh-air ventilating shafts;

one near the top and one near the bottom, with wrought iron catches built into the walls.

The doors were hung in brick rebates and before they were put into position the rebates were screeded with plaster mixed with lime mortar.

The doors fitted closely against the screeds, and the joint between the door and the brickwork was pointed on the outside immediately before the test.

The door openings were approximately 3 feet 3 inches by 6 feet 9 inches. The fire was applied from one side and the doors were to open inward onto the fire side. The fuel used was gas.

The results are summarized thus:

DEAL DOOR.—In 30 minutes flame appeared over the top intermittingly; in 42 minutes flame also appeared down west side about 12 inches; in 55 minutes flame came continuously through the upper portion of door; in 65 minutes the upper portion of door was considerably burnt and flame was seen through several small holes burnt in the lower portion of the door.

PINE DOOR.—In 52 minutes no flame had come through the door or from the joints around same, although much smoke had come from the joints, and the wood around all the bolts and nails was much scorched; in 60 minutes flame came over the top of door and also through its upper part in several places; in 70 minutes, after water had been applied, the two inner thicknesses of the door were found practically burnt away and the outer thickness (which was for the most part in position) much damaged.

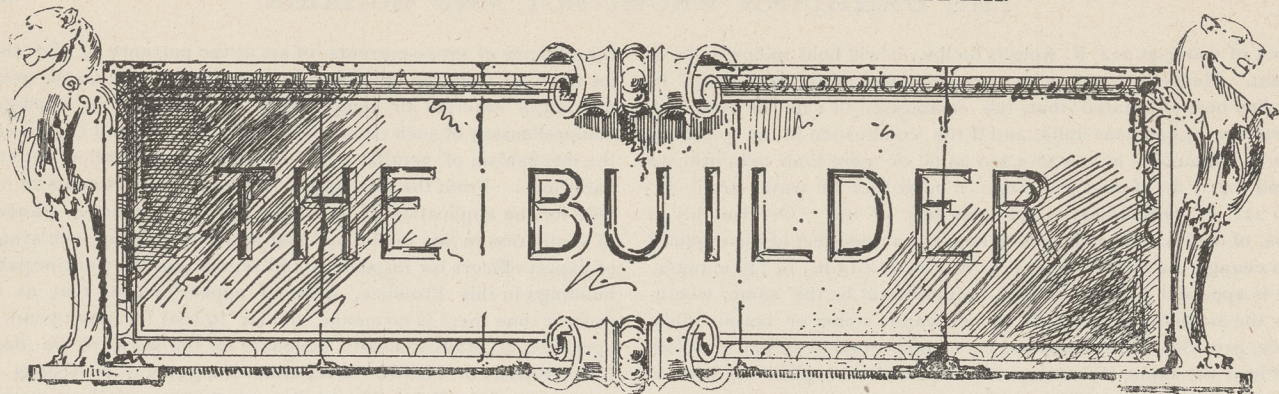
Fawn color or antique oak woodwork may have dark dull drab walls with a frieze of Gobelin blue or red, dull drab, Gobelin blue or red cornice, light drab ceiling, with upholstery of drab, Gobelin blue and Gobelin red, and draperies of blue and Nile green.

TESTS OF DEAL AND PINE DOORS.

THE British Fire Prevention Committee report the results of a recent test of a fierce fire of one hour, gradually increasing to a temperature of 2,000 degrees Fahr. upon a $2\frac{5}{8}$ inch door of archangel deal, constructed in three thicknesses, and a $2\frac{5}{8}$ inch door of Quebec pine, similarly constructed.

The doors were 7 feet high by 3 feet 7 inches wide; they were constructed of three thicknesses of $\frac{7}{8}$ inch boards, the middle thickness being horizontal and the outer ones being vertical. All were tongued and grooved on the solid and nailed with 3 inch clasp nails clinched on the outside. The total thickness of the doors was $2\frac{5}{8}$ inches.

Each door had wrought iron strap hinges, one near the top and one near the bottom, 2 feet 6 inches long, $2\frac{1}{4}$ inches wide and $\frac{3}{8}$ inch iron bolts. The hinges turned on wrought iron pins, the ends of which were built into the walls. On each door were fixed two wrought iron latches,



[THIS DEPARTMENT IS DESIGNED TO FURNISH INFORMATION SUITED TO THE REQUIREMENTS OF THE BUILDING TRADES. READERS ARE INVITED TO ASSIST IN MAKING IT AS HELPFUL AS POSSIBLE BY CONTRIBUTING OF THEIR EXPERIENCE, AND BY ASKING FOR PARTICULAR INFORMATION WHICH THEY MAY AT ANY TIME REQUIRE.]

THE first thing to be considered in the **Preparing Estimates.** preparation of an estimate is the excavating and removal of surplus earth, if any. This should be made up into cubic yards, and the measurements should extend at least three inches beyond the outer edge of the footing; with extra beyond for batten of sides of excavation, depending on depth and nature of soil. If the surplus earth is to be carted away to some distance, figure accordingly, if wheeled out and left on lot charge for every twenty yards traversed. Excavating trenches for foundation walls should be accounted by the yard, and should be charged at a higher rate than for open excavations. The same should also be charged for excavating for pier footings and similar work. When underpinning is required and excavating is necessary extra care and time must be provided for in the estimate. Filling in and ramming to foundation must be charged for at a special rate, so also must be the cleaning up and grading the grounds after the foundation is in. All excavations for drains, pipes, etc., must be figured on, but when the contractor intends to sub-let the plumbing he may obtain the figures for the whole of the work in that department from the plumber.

Find the number of cubic feet of stone wall there will be in the foundation, footings, offsets and all projections included. One hundred and twenty-eight feet of loose stone make a cord according to custom, and one hundred cubic feet in the wall make a cord of finished mason work. In estimating for this work some account must be taken of the style of work and the character of materials, as it will take up more time and labor to build a wall with the harder stones than it will with freestones or sandstones. Usually, ordinary foundation walls are built up of rough quarried stones in random rubble as shown at Fig. 1. It will be noticed that only at the

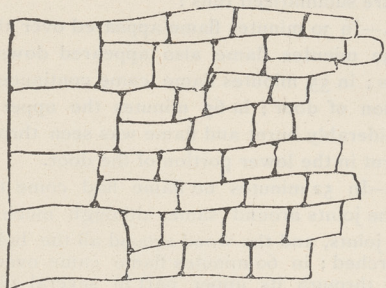


FIG. 1.—RANDOM RUBBLE.

corners is there any attempt at regularity, the other corners being formed of stones of any thickness. This style of masonry is about the most economical to construct, but when well done is quite suited to the pur-

pose of the ordinary dwellings or buildings not more than three stories high. A good mason will lay from two to three cords of this kind of work in a day, with proper help. In country places where quarried stone is not obtainable or obtained only at a big cost, walls are often built with field stone, but it is not safe to load up walls of this kind with too much superincumbent weight. A wall of this sort may be built very cheaply and some country masons are quite expert in laying field stones, and will put in three or four cords a day if proper help is allowed them. Another style of masonry is shown at Fig. 2, which is laid up, with broken field stones. This

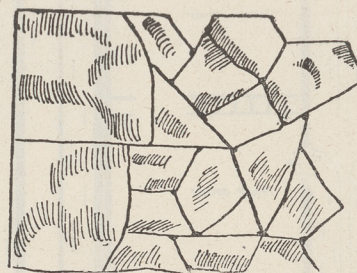


FIG. 2.—RUSTIC RANDOM RUBBLE.

is "rustic random rubble." The stones are fragments of "hard-heads," or large field boulders. With the exception of the quoins the joints are irregular, and as the stones are of various tints, the face of the wall, when the work is well done, shows up very nicely. This style of masonry is more expensive than either of the preceding examples, and this fact must be considered when estimating. There are several other styles of masonry employed in laying foundation walls, such as "coursed rubble," "irregular snecked rubble," "random rubble built up to courses," "broken ashlar," and others, but these are generally used on more expensive buildings than such as these paragraphs are supposed to deal with, so we pass them over for the present.

Brickwork.

In estimating for brickwork several things are to be taken into consideration before the price per M is determined. It is usual among bricklayers in the country towns to set a price on brickwork in the wall at so much a thousand; without taking into consideration the style of openings or the quality of the work required; and this price is generally the lowest given for work of the cheapest sort, a fact that often places the contractor in a false position, for it frequently happens that the better kind of brickwork costs double that of the common sort—the kind the contractor figured on—and this should be provided for when the estimate is first prepared. Openings having semi-circular or curved heads cost twice as much to construct as those having square heads and lintels over them, and gauged arches

with rubbed joints cost nearly twice as much as an arch made up of chipped bricks. Again, an elliptical or a four centred gothic arch costs much more to build and prepare the bricks than either of the foregoing. Circular work of any kind, bay windows or oriels, octagonal work, panels, belt courses, corning, gables, chimneys and offsets, take much more time to construct than ordinary running work, and should be provided for in the estimate. Hollow walls should be measured as per the actual thickness of the brickwork, with ample allowance for bonding and for extra labor. Half of all openings should be counted as solid wall under 110 feet face measure, to cover waste and extra labor. Bricks laid up in cement should be charged for extra labor and extra cost of cement. All wrought-iron bonding when used must be charged extra, as well as extra time employed in setting same. Building in fireplaces, setting in grates, placing in jamb tiles, and laying hearths should all be charged extra apart from the cost of materials. Piers for steps or for verandahs having two or more faces are extras and should be priced accordingly. When colored mortar is used there should be added to price of labor from 5 to 8 per cent., besides the extra cost of material; black mortar being the most costly to handle. Cleaning down the walls, while generally considered by contractors as run in with the price per thousand, is really an extra, and should be charged as such when closing the estimate, so also, should be the cleaning up of the grounds and removal of waste and rubbish. In topping off walls or finishing copings where cement is employed, the extra cost should be included in the estimate. In figuring up for the number of bricks required to complete any given quantity of work, the following rules may be of service. As before stated all openings having 100 or more square feet are not counted, but all having less than 100 feet are measured as one-half solid wall, therefore an opening having 90 square feet surface should be measured to contain 45 square feet of solid wall. This is allowed to cover waste and extra cuttings. Openings should all be measured at their greatest height and width. In measuring for a nine inch wall it is usual to allow 12 bricks for every square foot on the face of the wall, and for a 13 inch wall 22 bricks for each square foot, and 29 bricks for an 18 inch wall. In an experience of many years the writer has found these figures to be a trifle under the mark, and found that about 5 per cent. added to the result was nearer the correct thing. Chimneys having 9 x 9 or 9 x 13 flues are generally measured solid throughout, but chimneys having larger flues some reduction may be allowed. No reduction should be allowed for stone trimmings, such as caps, quoins, sills or stone belt courses, if the bricklayer sets the stones, but if the stones are set by a mason or other contractor. One barrel of lime contains three bushels, which, with one yard of sand, will make one yard of 1 to 3 mortar, which will lay about 80 feet cubic of rough brickwork or common rubble. One yard of colored mortar should lay about 90 cubic feet of fine brickwork. There should always be a damp course in brickwork, and the estimator should provide for this in his estimate. It may be of slate, asphalt or cement.

AFTER the blocks are properly prepared Setting Stone Work. and the surface on which they are to bed being truly level, the setting is an operation demanding great care in order to secure good joints and solid trustworthy work. In stonework, it

must always be borne in mind, only fine mortar is admissible, and this should be clean and the materials sharp, and it is important that no dirt, clay, or other uncementitious substance be interposed, as this destroys the binding of the cement, and, if of hard texture, is liable to fracture or chip off the delicate arrises of the blocks. Large stones should be first tried on their beds before setting, and then raised and withdrawn, the bed finally cleaned, well wetted, and the mortar laid even; the stone should then be brought near its place and gently lowered upon wedges, by withdrawing which it is brought exactly to its bed, when it may be pounded down home by a suitable wooden mallet or block of timber. Stones are raised and lowered by aid of a lewis, which is a contrivance for securing a firm hold of them, without defacing the faces or injuring the joints, the lewis hole being made on the top of the block, which becomes in turn the bed for the stone above. Cramps, joggles, dowels and plugs are names commonly applied to four different forms of connections respectively, thus: A cramp, which may be of lead or copper, is from six to ten inches in length, and from $\frac{5}{8}$ to $1\frac{1}{4}$ inches in thickness, having each end turned up to act as the cramp, and from one to two inches wide, according to the size of the stones to be joined together. If the cramp is of copper it is forged to the form and run in with lead. Lead cramps are formed at once by running the molten lead into the channels prepared for it. Joggles are of a double wedge form and usually of slate. They are sometimes cubes, inserted so that their diagonals coincide with the joints. Slate joggles and dowels are laid in fine cement or oil putty. Dowels are of a common square section, and are more frequently applied vertically, that is, to the beds of the stones, being inserted in the top of one block of stone and the bottom of another. A plug is similar to a dowel, but is formed by the mortices being run with cement or lead. Mason work is known as "plain" when worked to a smooth face; "sunk," when "cut in"; "stopped," when not finished to the end of a stone moulded, straight, cornices, strings, etc., without a bend; "circular," moulded circular neckings, columns, etc.; "circular circular," as in niches, domes and spheres; "dressed" or "cleansed" on face, and "tooled" on face. About $\frac{1}{8}$ the volume of ashler masonry should be mortar. Rubble masonry per cubic yard requires, of stone $1\frac{1}{5}$, and of mortar, $\frac{1}{4}$. Masons' specifications require very careful consideration, in so far as the description, quality, and mode of working stone goes, but the architect's drawings should furnish all necessary information as to the quantity and disposition of the stonework of a building. Half-inch scale drawings should be prepared of the masonry of windows, doors, and other features, and the jointing should be well shown on drawings. These details may be supplemented with one-eighth or quarter full-size sections of window jambs, sills and mullions, door jambs and mouldings, piers with their arch mouldings, bases and caps, cornices, columns, etc. The net amount of stonework can thus be actually computed by the estimator, and the contractor can obtain a fair idea of the amount of labor on the work. Such details are also most useful to the architect when the preparation of the full-size working drawings has to be undertaken, as he can discover exactly how much stone is required for any feature.

The employees of the McClary Manufacturing Company, London, Ont., held their annual picnic recently at Port Stanley.

ANNUAL CONVENTION OF MASTER PLUMBERS AND STEAM FITTERS.

The National Association of Master Plumbers and Steam Fitters of Canada assembled in annual convention in Montreal, on June 25th. The sessions of the convention were held in St. Joseph's Hall on St. Catharine street. Mr. J. W. Harris, president of the Association, presided, and welcomed the delegates from outside places. In the absence of the vice-president, Mr. Mansell, Mr. W. H. Meredith, of Toronto, was requested to fulfil the duties of the office. The following officers and delegates were present: President, J. W. Harris, Montreal; vice-president, (pro tem.) W. H. Meredith, Toronto; secretary, P. C. Ogilvie, Montreal; treasurer, W. H. Meredith, Toronto; vice-president of Ontario, H. A. Knox, Ottawa; vice-president of Quebec, John Watson, Montreal; vice-president of Manitoba, R. Ross, Toronto; vice-president of British Columbia, Joseph Wright, Toronto; vice-president of Nova Scotia and New Brunswick, Frank Powers, Lunenburg, N. S.; Toronto, W. J. McGuire; Ottawa, J. McKinley, F. G. Johnston and H. Normand; Montreal, James A. Giroux, G. C. Denman, J. A. Sadler,



MR. W. H. MEREDITH,
President National Association of Master Plumbers.

Joseph Gibeau, Thos. Moll, J. W. Hughes and Joseph Lamarche; Windsor, P. C. Ogilvie; Halifax, Frank S. Powers and John McFatridge.

The president in his annual report stated that most of the local associations were in a prosperous condition. He suggested that a conference be held with the jobbers and manufacturers for the purpose of inducing them to sell to members of the Association only, and in return the members would agree to purchase only Canadian goods. In order to distinguish Canadian goods it was suggested that manufacturers should place a trade mark on their material. It was announced that the association of boiler manufacturers had declined to deal with the Association, and immediate action with regard to this matter was recommended. During the year an association had been formed in Hamilton, in which was included all but one of the master plumbers of that city. Rules and regulations had been submitted by the journeymen's association for the approval of the master plumbers' association, and conference committees had been formed to consider questions affecting both associations. The enactment by the Dominion Parliament of a federal law regulating plumbing throughout the Dominion was advocated.

The president appointed as a committee on resolutions, Messrs. Jos. Wright, Jos. Giroux and Frank Power.

The report of the sanitary committee, presented by Mr. J. W. Hughes, showed that an increasing interest is being shown in sanitary matters and that the public are demanding a better class of goods and workmanship, which demand the manufacturers are meeting in a satisfactory manner. Regret was expressed that in some of the older cities no steps had yet been taken to adopt modern plumbing regulations, and it was suggested that the Dominion Parliament should pass a general law on the subject.

Reference was made in the discussion following the report to the opinion of the city solicitor of Ottawa that municipal councils have only the power to pass regulations to prevent unqualified persons from performing plumbing work, but have no authority to pass by-laws regulating the construction of buildings, or to compel drain layers to take out licenses. The president stated that the provincial government of Quebec had given municipalities power to pass by-laws regulating building construction and plumbing in general. He suggested that while the Dominion Parliament could not be asked to pass a by-law it could pass a law dealing with public health.

The report of the vice-president for Nova Scotia and New Brunswick stated that last year had been a prosperous one in the lower provinces, and that plumbers were beginning to feel the benefit of being connected with the Association. There had been some difficulty with the journeymen but an amicable settlement was looked for. A new regulation had been passed by the Halifax Board of Health compelling all master plumbers to pass a qualifying examination as journeymen plumbers. It was suggested that the Association should endeavor to have this regulation apply to the whole Dominion. It was urged that steps should be taken to devise means to avoid the difficulties and losses entailed by want of a proper system of estimating.

The report of the vice-president for Quebec recommended that an effort should be made to revive publication of the Association Bulletin, and that the constitution be so amended as to provide that the secretary of the National Association must be notified of changes made from time to time in the officers of the local associations.

Mr. H. A. Knox, vice-president for Ontario, in his report, expressed regret that the plumbers of that province were not as sympathetically united as they should be. It was suggested that other towns should follow the example of Ottawa, Brockville, and Smith's Falls, by affiliating with the Association.

The report of the Executive committee stated that certain difficulties had arisen between the Hamilton association and the wholesale dealers, the adjustment of which it was hoped would soon be accomplished. Publication of The Bulletin had been suspended owing to lack of support. The appointment of a paid secretary was recommended.

The report of the secretary, Mr. P. C. Ogilvie, stated that the following are the local associations that are affiliated with the National Association: Montreal, 52 members; Toronto, 21 members; Halifax, 22 members; St. John, N. B., Stratford, St. Thomas, Hamilton, Ottawa, 11 members; London, Windsor, 8 members; Quebec, Kingston, Winnipeg, St. Catharines.

The committee on resolutions recommended the

adoption of the President's report and the appointment of a committee to wait on the boiler manufacturers and ascertain what grievances, if any, they entertain against the Association; the adoption of the reports of the secretary and vice-presidents of Ontario, Quebec, Nova Scotia, New Brunswick, and Prince Edward Island, also the reports of the Sanitary and Executive committees. The Association was advised to endeavor to secure Dominion legislation on the lines suggested in the report of the vice-president for Nova Scotia. The hope was expressed that it might be found possible to continue the publication of The Bulletin.

The reports of the sanitary and executive committees were adopted.

A committee was appointed to report on the advisability of reviving the publication of The Bulletin.

Messrs. John McKinley, Ottawa; W. J. McGuire, Toronto; R. Ross, Toronto; J. W. Harris, Montreal; and J. A. Sadler, Montreal, were appointed a committee to confer with the representatives of the manufacturers and of the wholesale supply firms.

The question of the desirability of organizing provincial associations was left over until the next meeting.

Messrs. John Watson, John McKinley, Jos. Wright, Frank Power, Jos. A. Giroux were appointed a nominating committee, and Messrs. H. A. Knox, J. A. Sadler, and F. F. Power an auditing committee.

Mr. Frank Power, of Lunenburg, N. S., extended a cordial invitation to the Association to hold its next meeting in Halifax. The question of place of next meeting was, after some discussion, put to a vote, and it was found that the majority of the members were in favor of the convention being held in Toronto, and it so was decided.

A deputation representing the manufacturers and wholesale supply houses was introduced, when Messrs. J. W. Harris, J. W. Hughes, and Ald. Jos. Lamarche were appointed a committee to confer with them regarding any grievances or matters in dispute.

SECOND DAY.

On business being resumed on Friday morning, Mr. Joseph Wright reported on behalf of the committee appointed the previous day, that the wholesale supply trade did not care to advertise in The Bulletin, and recommended that for the present year no attempt be made to revive its publication. The report was adopted.

The report of the treasurer, Mr. W. H. Meredith, showed receipts of \$609.50 during the year, which, with \$170.44 carried over from the previous year, made a total of \$779.94. The expenditure was \$458.52, leaving a balance of \$321.42. Mr. Meredith estimated that the surplus would probably be reduced to \$200 after the official report of the proceedings had been printed.

The report was referred to the auditing committee, which certified to its correctness, and on motion it was adopted.

Mr. Frank Powers of Lunenburg, N. S., was appointed organizer for the Maritime provinces, and a grant of \$25 was made to him for expenses.

The convention then proceeded to the election of officers, with the following result:

Past President—J. W. Harris, Montreal.

President—W. H. Meredith, Toronto.

Vice-President—John McKinley, Ottawa.

Secretary—W. Mansell, Toronto.

Treasurer—Ald. Jos. Lamarche, Montreal.

Vice-President for Ontario—W. Pennington, Windsor, Ont.

Vice-President for Quebec—T. Thibeault, Montreal.

Vice-President for Manitoba—J. H. Wilson, Toronto.

Vice-President for Nova Scotia—Frank Power, Lunenburg, N. S.

Vice-President for British Columbia—Joseph Wright, Toronto.

Chairmen of Committees: Apprenticeship, T. G. Johnston, Ottawa; Legislative, J. W. Harris, Montreal; Sanitary, Frank S. Power, Halifax; Essay, E. C. Mount, Montreal.

Each chairman selected his own committee, and before the convention adjourned the following had reported:

Sanitary—F. S. Power (chairman), G. A. Perrier, Geo. Kinsman, James Farquhar, all of Halifax, and Frank Dexter, Truro, N. S.

Apprenticeship—F. G. Johnston (chairman), John Hyman, H. A. Knox, H. Normand, E. B. Butterworth, all of Ottawa.

Essay—E. C. Mount (chairman), John Watson, Joseph A. Giroux, Joseph Gibeau, and P. J. Carroll, all of Montreal.

On motion of Ald. Lamarche, seconded by Mr. F. S. Power, a hearty vote of thanks was tendered to the retiring officers.

In accordance with the suggestion of the vice-president for New Brunswick a committee was appointed consisting of Messrs. Frank S. Power and John McFatridge to compile an estimate and price book to be sold to the members.

Mr. Knox stated that the plumbers' association of Ottawa, had notified the architects of that city that they would only submit tenders direct to the proprietors, and it had been found to work well. Mr. Wright stated that an effort in the same direction was being made in Toronto.

SOCIAL FEATURES.

The social features of the convention included a banquet at the Windsor Hotel, which was attended not only by the plumbers, but also by a large number of the manufacturers and wholesale supply firms, among whom were noticed: Messrs. John M. Taylor, manager of the Dominion Radiator Co., Toronto; H. W. Anthes, of The Toronto Foundry Co.; Alex. Robertson, of The James Robertson Co., Limited; Geo. Moffat, of Robert Mitchell & Co.; H. R. Ives and E. Hebert, of H. R. Ives & Co.; H. McLaren and McAvity Stewart, of McAvity & Co.; Mr. Ramsay, of The Pedlar Roofing Co.; Mr. Moore, of The Paul Heating System Co., Boston; J. H. Garth and J. A. Meadowcroft, of Garth & Co. In addition to the usual patriotic toasts was one to the "National Association of Canada," proposed by Mr. Frank Powers and responded to by past president Harris; "The Corporation of Montreal," responded to by Ald. Lamarche; "Our Guests," proposed by the new president, Mr. Meredith, and responded to by Messrs. H. W. Anthes, H. R. Ives, Alex. Robertson, John M. Taylor, Mr. Stewart and Mr. Ramsay; "The Montreal Association," responded to by Mr. Giroux. The success of the banquet was largely due to the efforts of the committee, Messrs. Giroux, Meadowcroft and Sadler.

On Thursday afternoon the delegates were taken for a carriage drive to the top of the mountain where luncheon was served. On Friday afternoon they were given a street car ride through the city to Lachine and from thence made the trip down the Lachine rapids.

LEGAL.

In a recent case in England the plaintiff and defendant were owners of adjoining plots of ground forming part of a building estate, and these plots were each subject to a covenant that not more than one house was to be built on each plot. The defendant wished to build a block of flats upon each of his plots, but the plaintiff complained that this was a breach of the covenant, and sought for an injunction to restrain the defendant from erecting these buildings. The motion was refused by the Judge, who was of the opinion that each block of flats was one house only, and not a series of houses as contended, and the plaintiff appealed, but the Court dismissed it, the Master of the Rolls confirming the judge's opinion. In his opinion the word "house" in the covenant did not refer to the mode in which the building was to be subdivided and let, but the aggregate of the rooms making up the building. When the word was applied to a covenant of this description it did not refer to the interior portions of the building, but to the whole thing. One of the London papers says that the decision is important as affecting all future restrictive covenants, as if a block of flats is intended to be excluded it ought to be so described.

According to a recent decision of the Queen's Bench Division of the British Courts, contractors are responsible for the safety of scaffolding erected by sub-contractors employed by them, unless there is specific agreement to the contrary. This decision was given in the case of *Pavis v. Wills*. The plaintiff, who was employed by a sub-contractor in the erection of houses at Battersea, whilst working under a scaffold constructed by another sub-contractor, met with an accident which injured his thumb by a slate falling through the boards, and was unable to work for four months. The scaffolding was put up by the sub-contractor for brickwork; but as he had not pointed the walls the scaffolding was not removed, and it was utilized by other sub-contractors. The defendant appealed. The case was heard on appeal by the defendant builder from the decision of the County Court by Mr. Justice Ridley and Mr. Justice Darling. They held the builder responsible because he had contracted for the erection of the scaffolding by the sub-contractor for brick-laying; that he permitted it to be used, and had allowed it to remain on the premises. Although he had not provided it or constructed it, the judges inferred that he had adopted it, and permitted workmen to use it. The appeal was therefore dismissed.

The Court of Appeal at Montreal has reversed the judgment of Mr. Justice Doherty in the case of *Sincennes and Courval*, architects, and the *Institution Catholique des Sourdes-Muets*. The appeal arose from a judgment of the Superior Court maintaining the pretensions of the plaintiffs, as to their having a valid privilege on a certain property, belonging to the appellants, for the payment of their services in connection with buildings erected upon the property. The claim amounted to \$180. The institution sold some lots to one *Zotique Terriault*, upon which he erected some buildings, *Sincennes and Courval* being the architects. In February, 1898, *Terriault* became insolvent, and left the buildings in an uncompleted state. In the terms of sale the property returned to the institution. On the 16th of May the architects registered their claim for \$180 against the lots. A notice of this registration was on the same day sent both to *Terriault* and to the appellants by letter, mailed in the city of Montreal. The appellants received on the following day, or the 18th. The judgment maintained the privilege and ordered an expert to determine the relative value of the lot, and of the buildings, as provided by the Code of Civil Procedure. From this judgment the appeal was taken. The institution paid off certain claims against the property. The effect of the judgment of the Court of Appeal is that while it is declared that the architect shall have a privilege for such services as he may render under a contract between him and the builder, the article 2013c tells him it will exist only for eight days absolutely, and that if he wishes to preserve it beyond that time he shall give a notice to the proprietor. The court was therefore of opinion that the plaintiffs failed to preserve their privilege and by neglecting to give, within eight days from the making of their own contract with *Terriault*, notice of it to the proprietors, they can no longer exercise it against the property.

FERGUSON VS. GALT PUBLIC SCHOOL BOARD.—Judgment by the Court of Appeal at Toronto on appeal by defendants from order of a Divisional Court setting aside judgment of non-suit entered by *Boyd, C.*, and directing a new trial. The action is for damages at common law, and under the Workmen's Compensation for Injuries Act, for injuries sustained by plaintiff while

engaged upon the construction of a retaining wall on the school premises, in the town of Galt. It was contended below that the evidence showed that when the accident happened the plaintiff was acting under the orders of one *Webster*, a superior, and that the accident occurred on the premises of defendants. The Divisional Court held that at common law, it being undoubtedly the duty of the master to provide good and sufficient apparatus for the servant, there was evidence here to go to the jury that it was insufficient and defective; and that under the Act there was evidence to go to the jury that plaintiff was acting under *Webster's* orders, and that *Webster* was plaintiff's superior, whom he was bound to obey; and there was evidence that *Webster* was a person entrusted by defendants with the duty of seeing to the conditions of the ways, etc., within sub-sec. 1 of sec. 6 of the Act, and *Garland v. City of Toronto*, 23, A.R., 238, was distinguished. That court also held that there was no evidence, even if material, as plaintiff did not know it, to show that the defendants' workmen were trespassers. It was contended *inter alia* that at common law the plaintiff and *Webster* were fellow servants, and the way where the accident took was constructed by them according to their duty, and there was therefore no liability arising out of negligent construction (*Hedley v. Pinkney*, 1894), A. C., 222; and that there was no evidence to show that *Webster* was plaintiff's superior, or one to whose orders he was bound to conform. They were merely two fellow-laborers. Held, that plaintiff and *Webster* were fellow-workmen, and that this case is distinguishable from *Garland v. City of Toronto*, 23, A. R., 238. Appeal allowed with costs, and judgment of *Boyd, C.*, restored.

NEW YORK AND OTTAWA COMPANY V. COLLINS' BAY RAFTING AND FORWARDING CO.—This important action came up for trial at the non-jury sittings of the High Court of Justice at Cornwall recently. The plaintiffs sought to have it declared by the court that the sum of \$20,000 deposited in the Bank of Montreal as security for the fulfilment of certain work be paid over to them. In the autumn of 1898 the *Collins Bay Rafting and Forwarding Company* undertook a contract for the removal of the wrecked spans of the railway bridge in the south channel of the *St. Lawrence River*. Under terms of this contract they were to be paid \$25,000 for a completed job, and were to have until the end of the season of 1899 to complete same. The *New York and Ottawa Company* deposited as security for the completion of the work \$25,000 in the names of *R. A. Pringle* and *Wm. Leslie* as trustees. Five thousand dollars of this money was paid over to the *Collins Bay Rafting and Forwarding Company* in the fall of 1898, and the balance still remains in the names of the trustees. The *New York and Ottawa Company* contend that the *Collins Bay Rafting and Forwarding Company* have failed to complete their contract according to the agreement, and that the plaintiffs are entitled to have this money paid over to them. The *New York and Ottawa Company* also claim damages for the non-completion of contract. The *Collins Bay Company* contend that the time was not the essence of the agreement, and that they still have further time to complete their contract. The case was tried before the Hon. Mr. Justice Street, whose judgment declares that defendants have duly prosecuted their work without breach and are entitled to \$5,000 of the contract price for removing the southern span of the bridge and \$5,000 more for putting it on the shore, and dismisses action with costs without prejudice to plaintiffs' right, if so advised, to bring any further action or actions for any other or later breaches of the contract. Judgment for defendants on their counterclaim for \$5,000 (in addition to the \$5,000 already paid them) and counterclaim dismissed without costs as to balance claimed without prejudice to their right to recover in any future action the balance of the contract price if they show themselves entitled on the ground of completion of contract or any other grounds save those in paragraphs 8, 9 and 12 of defence and counterclaim.

The interior of the Cathedral at St. John, N. B., is being redecorated.

The annual picnic of the employees of the *Gurney Foundry Company, Limited*, Toronto, was held a fortnight ago at *Burlington Beach*.

It has been arranged that the members of the *London Builders' Exchange* shall pay a visit to the Builders of *Cleveland, Ohio*, on the 24th and 25th inst. The *London Builders* will reach *Cleveland* at 6.30 in the morning and will be met on their arrival by members of the *Cleveland Exchange*. The day will be spent at *Senic Park*. In the evening a banquet will be held at the *American House*. A most enjoyable time is anticipated.

MANUFACTURES AND MATERIALS

TERRA-COTTA.

A lecture on terra-cotta and its uses was recently given at the Midland Institute, Birmingham, by Mr. J. C. Nicol. The lecturer, after pointing out the antiquity of the use of terra-cotta, as illustrated in the buildings of the Babylonians and Assyrians, described the composition of the material. Most modern manufacturers, he said, had to mix and blend their clays, bringing parts from a distance, so as to get together a suitable combination of texture and color, whilst some introduced color pigments, which in baking came out quite different from what was expected of them, though by repeated trials and observations good tints, particularly bluish-grays and pinks, could be obtained.

Architecturally speaking, the term terra-cotta was given to the blocks above the size of the ordinary bricks, and capable of decoration by casting from a modelled enrichment. The forms used should never be made on stone outlines, nor should the material be made to look like stone in any particular. It had a distinctive character of its own as a plastic and modelled material, although there was no structure in stone that could be worked out in terra-cotta. Indeed, by the use of iron brackets and concrete cased with terra-cotta greater projections could be obtained, and columns and entablatures of any size could be wrought out. Yet the architect who had been accustomed to design heavy stone buildings, and wished to change his material, would fail dreadfully if he did not realise that he was working in an entirely different medium. Terra-cotta itself would not outrage any of the canons of art, but the misuse of it would. When subjected to heavy weights in walls, due to imperfect filling, terra-cotta was liable to crack. The pocketing taken out to equalise the shrinkage in burning must be filled in with concrete that would not shrink when set. Referring to the durability of the material, Mr. Nicol said it was sometimes desirable in exposed situations that copings, cornices, and gutters formed in terra-cotta should have damp courses of lead or slate in case the joints should perish, and in all cases the ends and joints should be made in cement. All blocks should be equally well

burnt, as the ordinary constituents of town atmosphere would then not affect it. The free acids found in the air of manufacturing centres like Birmingham would permeate the pores of the soft bricks and dissolve the more soluble constituents.

THE CANADA RADIATOR COMPANY, LIMITED.

The Canada Radiator Company, Limited, whose advertisement first appears in this number, make the following claims in behalf of the "Canada" radiator. "The company is manufacturing a patented radiator with a positive and perfect circulation and differing from the ordinary radiator in that the steam or water must travel the length of each loop before entering the next. In the ordinary radiators as at present constructed the hot water ascends the first loop to the top and flows along the top falling throughout all the loops as it cools and discharges into the return pipe; thus the water only travels twice the height and once the length of the radiator, while in the "Canada" the water travels as many times the height of the radiator as there are loops in it.

In the ordinary steam radiator there is no provision at the top of the loops for the escape of the air, which is expected to fall to the bottom of the loop against the pressure of the steam and travel along the bottom of the radiator and then rise to escape through the air vent. This defect in construction has caused the introduction of what is known as the "Paul system of vacuum" which is largely used in all our large buildings. In the "Canada" the air is driven before the steam and there is no chance for it to pocket and thus hamper the circulation and expensive means for extracting it are not necessary. Owing to the perfect circulation and provision for carrying off the air the same radiator is adapted for use in either a steam or hot water plant. This company claims that because of the construction of their radiators its use will save both in the installing of the plant and in subsequent fuel bills."

The Toronto office of the company is at 124 Bay street, where they have a very nice display.

The Manitoba Union Mine Company has been incorporated with a capital of \$500,000 to manufacture portland cement at Miami, Man.

The works of the west Kootenay Brick and Lime Company at Nelson, B. C., have recently been purchased by a company organized by Mr. Ernest Mansfield. The new company will develop a marble quarry opposite Kaslo.

Mr. E. Brevender, formerly of the Napanee Cement Works, is organizing a company to manufacture portland cement at Lakefield, Ont. The town has granted the company a bonus of \$10,000. Works will be erected at once, and will it is said be operated by electricity.

The New **SOLAR PRISMS** are the BEST and CHEAPEST

Manufactured by the Solar Prism Co., of Cleveland, O., U.S.A.

The **N. T. LYON GLASS CO. Limited**, 141 Church Street, TORONTO
AGENTS FOR CANADA

WIRE LATH

The only perfect Lathing, for the reason that the Wire is completely embedded in Mortar and CANNOT RUST. It is the only Lathing that will stand the test of time.

THE B. GREENING WIRE CO.
(LIMITED)

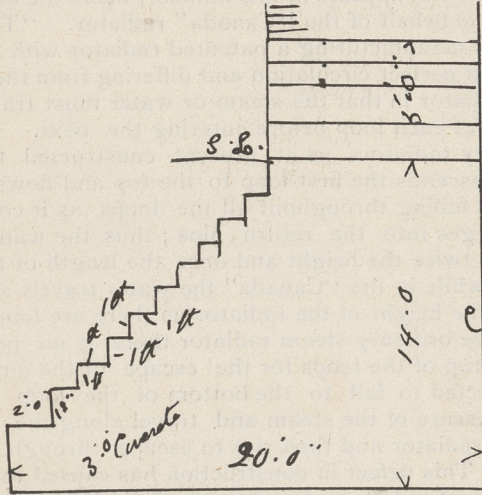
Hamilton, Ont. - Montreal, Que.

JOHN KAY'S & CO. LTD.
ART-FURNITURE
FABRICS · POTTERY
AND INTERIOR
DECORATIONS
36-38 KING ST. WEST TORONTO

COLLAPSE OF A CHIMNEY AT HAMILTON.

To the Editor of the CANADIAN ARCHITECT AND BUILDER:

SIR,—You have in the CANADIAN ARCHITECT AND BUILDER an article on the chimney built at the Hoefner Refining Company's Works, Hamilton. Being the architect of the said structure, there are some points which I would like to explain. The copy of the plan is all right, only that the foundation was stepped up one foot higher, as per sketch. It was stepped up one foot each time off a two-foot offset on the concrete, instead of a two-foot step



each time off a three-foot offset on the concrete. In regard to the weight per cubic foot of brickwork, there are 18 bricks in one cubic foot, at $4\frac{3}{4}$ lbs. each, net $85\frac{1}{2}$ lbs. of brick, and one cubic foot of mortar, $22\frac{1}{2}$ lbs., or a total of 108 lbs. per cubic foot. There being 36,500 cubic feet at 108 lbs. = 1,640 tons, or $5\frac{1}{3}$ tons per cubic foot. A reliable contractor here states that the average brickwork will weigh 112 lbs., not 108 lbs., per cubic foot, which would still leave a fraction less than 6 tons to the cubic foot, and a safe load is $6\frac{1}{2}$ tons. There was a very high wind at the time of the accident. The chimney fell in a N. W. direction, not N. E. We received a tender from a contractor to put additional

50 feet on the chimney before it was completed. This is the reason why the top of the chimney walls was so thick. The bricks were not all first class, but soft brick was smuggled in, also large ragged pyramidal stone with no particular bed, also other pieces, one especially of rotten blue slaty stone, which was thicker than two courses of brick and which crushed under the weight. The contractor also neglected to keep the tunnel and the chimney dry, there being fully 2 feet deep of water and ice in the tunnel, which saturated the brickwork throughout with damp and frost. The work was altogether in his charge to deliver complete. A good percentage of the money was held back. I gave the contractor no authority whatever to build in stone; he put it in at his own risk.

Yours, etc.,

E. B. PATTERSON.

PUBLICATIONS.

"Furniture Designing and Draughting." By Alvan Crocker Nye, Ph. B., Instructor in Furniture Designing, Pratt Institute, Brooklyn. New York City: Wm. T. Comstock, Publisher, 23 Warren Street, New York, N. Y. One octavo Vol., Cloth. \$2. For classes in design the book will serve as a text book, for with it a knowledge of the elementary forms and principles of construction necessary to good designs can be obtained. The experienced draughtsman will perhaps find the book a handy reference, as it gives in convenient form much data that is not always easily remembered. To the architect who occasionally must give some consideration to furniture, the tables of dimensions, if not the entire work, will be a great aid. In fact, this is a serviceable book for everyone who has to do with drawings for furniture.

Mr. George Warwick, one of the oldest contractors of Brockville, Ont., died in that city on July 11th, aged 80 years.

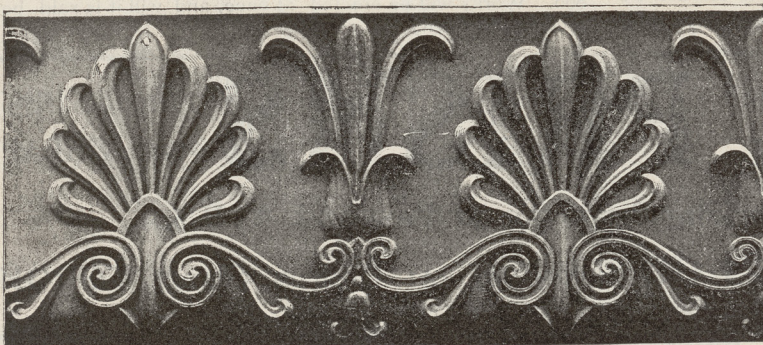
A despatch from Paris states that the International Jury of Fine Arts has awarded a third class gold medal to Mr. A. Luzor-Cote, a Canadian artist, for paintings exhibited in the Canadian department of the Paris exposition.

A despatch from London, Eng., states that the county council has decided to send a deputation of architects and engineers to the United States and Canada to investigate the methods of construction and system of management of public asylums.

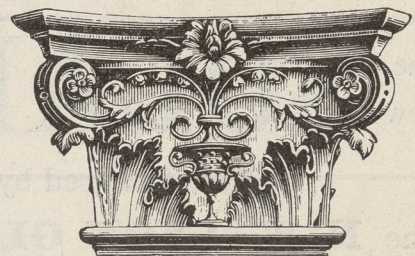
Mr. Bernard McEvoy, who recently visited and inspected technical schools in a number of the leading cities of the United States, by direction of the Education Department of Ontario, has expressed the opinion that the Athletic Club building purchased recently by the city council of Toronto for technical school purposes is not adapted to properly fulfil that object.

Pressed Zinc Ornaments

For all Architectural Work



FRIEZE No. 6429.



CAPITAL No. 7008.

We now have perfect facilities for turning out every ornamental style of finish—equal to any of foreign manufacture.

Our new Catalogue shows varied handsome designs in Leaves, Modillions, Brackets, Capitals, Festoons, Garlands, Wreaths, Enrichments, Friezes, Rosettes, &c.

The work is all clearly brought out in detail, with very bold relief.

We invite your attention to the beauty and practical reliability of all such Architectural needs, as manufactured by us—full information in our finely illustrated Catalogue.

METALLIC ROOFING CO., Limited

Wholesale Manufacturers.

KING and DUFFERIN STREETS, TORONTO

Architects.

FRANK DARLING. J. A. PEARSON.
DARLING & PEARSON
 Architects,
 Members of the Ontario Association of Architects.
 Imperial Bank Building, - TORONTO
 Leader Lane

SYMONS & RAE,
ARCHITECTS
 35 Adelaide St. E., - TORONTO.

Henry Langley. Chas. E. Langley.
LANGLEY & LANGLEY,
ARCHITECTS
 Members of the Ontario Association of Architects.
 Canada Life Building, King St. W., TORONTO.

EDMUND BURKE & J. C. B. HORWOOD
ARCHITECTS
 Union Loan Chambers,
 28 AND 30 TORONTO STREET, - TORONTO.

W. R. STRICKLAND,
ARCHITECT
 35 Adelaide Street East, - TORONTO.

DAVID ROBERTS,
ARCHITECT
 Office, No 17 & 18 Union Block, } TORONTO.
 Cor. Toronto & Adelaide Sts. }

GEO. M. MILLER & CO.
ARCHITECTS
 Toronto General Trusts Building - TORONTO

J. C. FORSTER,
ARCHITECT
 Member Ontario Association of Architects.
 MEIRS BLOCK, - OWEN SOUND.

POWER & SON,
Architects and Building Surveyors,
 Merchants' Bank Chambers,
 KINGSTON, - ONTARIO.

Please mention the CANADIAN ARCHITECT
 AND BUILDER when corresponding
 with advertisers.



Embossed and Turned Mouldings

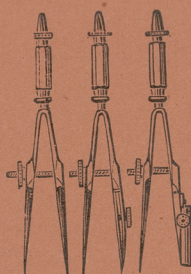
Latest Designs. Best Finished. Lowest Prices.
 Send for new Catalogue now ready.
THE ART METROPOLE 131 and 133 Yonge St.
 TORONTO

Telephone 5335
TORONTO FOUNDRY CO.
 Manufacturers of
 Soil Pipe and Fittings, Boiler Stands, Sinks
 and General Castings
 146-148-150 Niagara St., Toronto

Legal.

QUINN & MORRISON
 Advocates, Barristers and Solicitors

Temple Building,
 185 St. James Street, Montreal
 M. J. F. QUINN, Q. C., M. P., Crown Prosecutor.
 M. J. MORRISON, B. C. L.

DRAUGHTING INSTRUMENTS

HEARN & HARRISON, 1640-2 Notre Dame St.
 MONTREAL, QUE.

If you want to

SELL ANYTHING

to the wholesale and retail hardware merchants and manufacturers

ANYWHERE

in Canada, you can reach them through

THE CANADIAN
HARDWARE AND METAL MERCHANT

MONTREAL and TORONTO

Circulates in Every Province.

GÜNTHER WAGNER'S Chin-Chin and Pelican WATERPROOF DRAWING INKS



Are used and endorsed
 by the leading Schools,
 Colleges and Institutes.
 No single testimonial has
 ever been solicited, yet the
 merits of the Inks have
 called forth approbation
 from all classes of
 draughtsmen at home and
 abroad.

For sale by all dealers.
 Color cards, showing
 actual tints, free.

CANADIAN DEPOT:
THE ART METROPOLE,
 131 Yonge Street - Toronto.
 BRITISH WHOLESALE DEPOT:
HARRY STEUBER,
 12a Watling Street - London E.C., Eng.

TENDERS WANTED

A Weekly Journal of advance information and public works.

The recognized medium for advertisements for 'Tenders.'

CANADIAN CONTRACT RECORD
 TORONTO.

LARGE STORE WINDOWS

are an essential feature in good mercantile architecture. Sometimes the windows need good night light as well as daylight. My special patent store-window light is the best device for brilliantly lighting show windows.

Write for particulars.

I. P. FRINK, 551 Pearl Street, N. Y. City

THE CONSOLIDATED PLATE GLASS

COMPANY OF CANADA (Limited)

HEAD OFFICE:

73 and 75 Wellington Street West, TORONTO

BRANCHES:

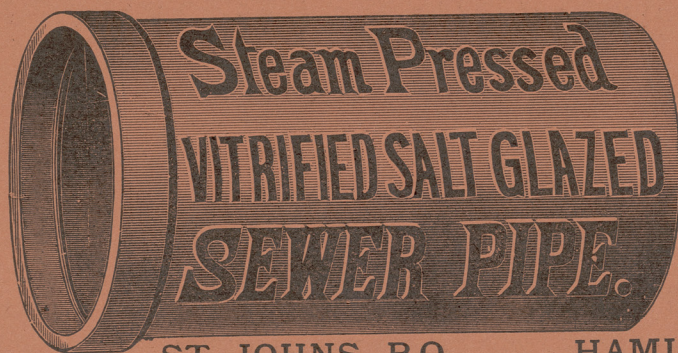
MONTREAL, LONDON, OTTAWA
 16 Inspector St.

F. H. MCCAUSLAND, Toronto, President.

WM. R. HOBBS, London, } Vice-Presidents.
 ALEX. RAMSAY, Montreal, }

Correspondence solicited. Estimates Given.
 Special Discount to the Trade.

The CANADIAN SEWER PIPE CO.



WATER PIPE

CULVERT PIPE

FLUE LININGS

CHIMNEY TOPS

SMOKE PREVENTIVES

INVERTS, &c.

Write for Terms and Discounts.

ST. JOHNS, P.Q.

HAMILTON, ONT.

TORONTO, ONT.

BRONZE HARDWARE

We will be glad to give you Estimates on any Specification you may submit—We can make you Exceptionally Low Figures on Builders' Hardware

TILES & MANTELS

Plain and Decorative Wall Tiles—For Kitchens, Bathrooms, Lavatories, Etc.
Enamelled and Hand Painted Tiles—For Hearths, Facings, Linings, Fire Places, Etc.
Encaustic and Mosaic Tiles—For Churches, Halls, Vestibules, Conservatories, Etc.

Designs will be forwarded on receipt of plan of spaces to be covered with tile with estimated cost of same laid by experienced workmen in any part of the Dominion.

WROUGHT IRON
AND BRASS

FIRE PLACE GOODS

RICE LEWIS & SON, LIMITED, TORONTO



CABOT'S CREOSOTE SHINGLE STAINS

The Original and Standard Shingle Stains are made only by SAMUEL CABOT, of Boston, Mass. Every package bears his trade mark, and every gallon is guaranteed. Used and proved in every climate for nearly twenty years. Also

CABOT'S Sheathing and Deafening "Quilt"

the most perfect insulator of heat and deadener of sound on the market. Decay, moth and vermin-proof, and unflammable.

Samples, Catalogue and full information upon application to the manufacturer or his

CANADIAN AGENTS:

ANDREW MUIRHEAD, 82 Bay St., Toronto.
SEYMOUR & CO., Montreal.
C. G. HENSHAW, Vancouver.
F. H. PRYDGES, Winnipeg.
W. H. THORNE & CO., St. John.
E. D. ADAMS Halifax.

"BEAVER" PORTLAND CEMENT

Manufactured by the Beaver Portland Cement Company, Limited.

COMMERCIAL WOOD & CEMENT CO., Sole Sales Agent, MONTREAL.

The Owen Sound Portland Cement Company, Limited

WORKS AT . . .
SHALLOW LAKE, ONT.

Over 39,000 barrels of our SAMSON BRAND PORTLAND CEMENT sold during 1895, and not a single complaint received as to its quality.

[The City of Toronto have contracted with us to supply our SAMSON BRAND PORTLAND CEMENT for the requirements of the whole city for 1897 and 1898.]

Can you wish any better recommendation?

Canada can produce as good Portland Cement as made in the world, and we are making it.

We guarantee the quality to be equal in every respect to the best imported brands from England and Germany.

SIDEWALK CEMENT A SPECIALTY

For testimonials, prices and further information, apply to the Manager, Shallow Lake, Ont., or to

Correspondence Solicited

JOHN LUCAS

377 Spadina Ave., TORONTO



The Turnbull & Russell Co.

MANUFACTURERS OF

ELECTRIC, HYDRAULIC,
HAND and POWER

ELEVATORS

AND
DUMBWAITERS

TURNBULL ELEVATOR WORKS

126 John Street,

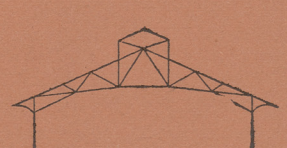
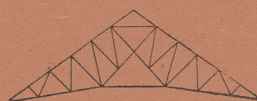
TELEPHONE 8238

Toronto, Ont.

THE HAMILTON BRIDGE WORKS CO., LIMITED

HAMILTON, CANADA

ARCHITECTURAL STEEL



We have on hand at all times a large stock of . . .

BEAMS, ANGLES, CHANNELS, TEES, PLATES, Etc.

and are therefore in a position to quote close prices and can guarantee quick delivery. When you require anything in this line GIVE US A CHANCE TO QUOTE YOU FIGURES.